BIOLOGICAL DATA FROM EXPERIMENTAL FISHERIES AT SPECIAL HARVESTING AREAS IN THE SAHTU DENE AND METIS SETTLEMENT AREA, NWT: VOLUME 1. THE UPPER RAMPARTS AND LITTLE CHICAGO AREAS OF THE MACKENZIE RIVER

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Central and Arctic Region
Department of Fisheries and Oceans
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by

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This is the 108th Data Report

from the Central and Arctic Region, Winnipeg

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PREFACE

This report was prepared under contract for the Department of Fisheries and Oceans, Central and Arctic Region, 501 University Crescent, Winnipeg, Manitoba, R3T 2N6. The Scientific Authority for this contract was A. C. Day of the Resource Management Section.

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Twenty-eight Special Harvesting Areas (SHA) for fish were established under the Sahtu Dene and Metis Comprehensive Land Claim Agreement. These areas are the sites of important traditional fisheries by participants in the agreement. In 1995, to facilitate the management of these fisheries, the Department of Fisheries and Oceans began a five-year study to collect biological data from fish populations harvested in the 15 SHA's outside Great Bear Lake. During July and September 1995, eleven species of fishes were collected from the Mackenzie River at the Little Chicago (SHA 1) and the Upper Ramparts (SHA 2). This report presents data on the number and weight of fish caught per unit of sampling effort; on the age, length, weight, sex, and maturity of the fish; and on the concentrations of mercury, arsenic and selenium found in the muscle, kidney, and liver tissues of broad whitefish (Coregonus nasus) and inconnu (Stenodus leucichthys).

Key words: Mackenzie River; Northwest Territories; stock assessment; fishery management; population parameters; fish growth; CPUE; tissue metals.

RÉSUMÉ

Stewart, D.B., G. Low, W.E.F. Taptuna, and A.C. Day. 1997. Biological data from experimental fisheries at Special Harvesting Areas in the Sahtu Dene and Metis Settlement Area, NWT: Volume 1. The Upper Ramparts and Little Chicago areas of the Mackenzie River. Can. Data Rep. Fish. Aquat. Sci. 1020: vi + 61 p.

Vingt-huit zones spéciales de récolte (ZSR) du poisson ont étés créées en vertu de l'Entente sur la revendication territoriale globale des Dénés et Métis du Sahtu. Ces zones sont le site d'importantes pêches traditionnelles effectuées par les parties à l'entente. Dans le but de faciliter la gestion de ces pêches, le ministère des Pêches et des Océans procédait, en 1995, à une étude de cinq ans dans le but de recueillir des données biologiques sur les populations de poisson exploitées dans les 15 ZSR situées à l'extérieur du Grand lac de l'Ours. En juillet et septembre 1995, des poissons de onze espèces ont été prélevés dans le fleuve Mackenzie à Little Chicago (ZSR 1) et la Upper Ramparts (ZSR 2). On trouvera dans le présent rapport des données sur le nombre et le poids des poissons capturés par effort unitaire d'echantillonnage, sur l'âge, la longueur, le poids, le sexe et le degré de maturité des poissons, et sur les concentrations de mercure, d'arsenic et de sélénium décelées dans les tissus musculaires, rénaux et hépatiques du corégone tshir (Coregonus nasus) et de l'inconnu (Stenodus leucichthys).

Mots clés: fleuve Mackenzie; Territoires du Nord-Ouest; évaluation des stocks; gestion des pêches; paramètres de population; croissance du poisson; PUE; métaux tissulaires.

INTRODUCTION

One of the provisions of the Sahtu Dene and Metis Comprehensive Land Claim Agreement, which was approved by Order in Council on 23 June 1994, was the establishment of twenty-eight Special Harvesting Areas for fish. These areas are the sites of important traditional fisheries by Sahtu Dene and Metis participants in the agreement. Their locations are described in schedule V, appendix E of the agreement.

The purpose of these Special Harvesting Areas is to protect and conserve the fisheries resource at these traditional harvesting sites. Under the agreement, any commercial fishing activities in these areas will gradually be phased out. Indeed, the only persons now eligible to obtain a licence to fish commercially in waters of the Special Harvesting Areas listed in schedule V, appendix E, are those who held a valid commercial fishing licence for those waters at the legislation date. To maintain this privilege the licence holders must continue to renew their licences each year thereafter. Persons who are not participants in the agreement may only fish for sport in the Special Harvesting Areas.

A number of the fish species harvested in the Sahtu Dene and Metis Settlement Area migrate long distances on a seasonal basis each year (Stewart 1996). These movements have important ramifications for fishery management in the Settlement Area (Figure 1). Long distance migrants such as Arctic cisco, broad whitefish, and inconnu may be vulnerable to harvest by Inuvialuit, Gwich'in, Sahtu, and Deh Cho fisheries. These fishes are available to harvesters on a seasonal basis at known locations. Some of them, perhaps all, also have discrete spawning stocks. Consequently fishermen at a given location and season may be harvesting fish from a number of different stocks.

To facilitate the management of fisheries at the Special Harvesting Areas, the Department of Fisheries and Oceans (DFO) is conducting a five-year stock assessment study. This study, funded by implementation money from the Land Claims Settlement, will collect seasonal baseline biological data from the fish populations harvested in each area. Beneficiaries from each community will be trained and employed to collect these data. This report documents data collected during the first year of the study at two Special Harvesting Areas of the Mackenzie River, Little Chicago (Area # 1) and the Upper Ramparts (Area # 2) (Figure 2). It is the first of a series of such reports that will document stock assessments of the fifteen Special Harvesting Areas outside Great Bear Lake. Stock assessments of the thirteen Special Harvesting Areas of Great Bear Lake may be conducted as part of a future study.

MATERIALS AND METHODS

The 1995 sampling program was conducted at three areas of the Mackenzie River: the Upper Ramparts which was sampled from 18-26 July and again from 5-14 September, Little Chicago which was sampled from 7-9 September, and an area upstream from Litue Chicago which was sampled from 11-15 September. The boundaries of the Upper Ramparts and Little Chicago Special Harvesting Areas are shown in Figure 2 and described in Appendix 1. The area immediately upstream from Little Chicago was sampled on an ad hoc basis.

FIELD SAMPLING

Fish were captured using gillnets by local fishermen from Fort Good Hope who were trained on site by a DFO biologist or technician. The bottom type gillnets used were 22.9 m (25 yd) in length and 1.83 m (6 ft) in depth. They were constructed of 210-3 woven white nylon and consisted of a single mesh size, either 89 mm, 114 mm or 139 mm (stretched measure), with a float line at the top and a lead line at the bottom. The nets were set in the manner used by local fishermen. They were set running offshore in river eddies, to avoid the strong currents; suspended from styrofoam floats so that their float lines were about 15 cm below the surface, to avoid tangling by floating debris; and above the bottom so that the lead lines did not silt into the river bottom. In some instances, the best fishing locations at the Upper Ramparts were avoided because they were already in use by the subsistence fishery.

The fishermen recorded the period of each gillnet set, and the mesh size, but did not report individual set locations. Given the migratory habit of most of the target species this omission is unlikely to affect interpretation of the data. In the field, each fish captured was identified to species, weighed (round weight ± 10 g; Superior Weighing Systems Ltd. Accu-weigh model DSY-1100), and measured (fork length ± 5 mm). Pectoral fins were removed and preserved in scale envelopes for age determination in the laboratory. Representative

specimens of broad whitefish and inconnu were also bagged and preserved frozen for laboratory analyses.

Catch per unit effort

The catch per unit of sampling effort (CPUE) was determined for each gillnet mesh size at each sampling location. To provide an estimate of the variability in the seasonal catch at each location for each mesh size, the data from all species were pooled for each set. The mean, range and variance of the CPUE are reported for each gillnet mesh/sampling site combination in terms of both the number and round weight (kg) of fish taken per 100 m of gillnet set for a 24 h period.

LABORATORY ANALYSES

The frozen specimens of broad whitefish and inconnu were partially thawed in the laboratory and then weighed (round weight ± 1 g, Scale Store electronic balance model MW6116) and measured (fork length ± 1 mm). Sex and stage of maturity were determined according to the method reported by Falk et al. (1982), as described in Appendix 2.

Sagittal otoliths and pectoral fins were removed for age determination, and a number of morphometric measurements were also taken (J. Johnson, DFO, Winnipeg). The fish were then re-frozen and archived by at the Freshwater Institute Science Laboratory in Winnipeg for future genetic (J. Reist), tissue heavy metals (L. Lockhart), and tissue composition studies (D. Metner).

Condition

The condition factor (K), a relative measure of the plumpness or robustness of the fish, was determined using the following formula:

$$K = (\text{round weight in g} \quad 10^5) \quad \text{fork length in mm}^{-3}$$

Age determination

Ages were determined by examinations of either pectoral fins or sagittal otoliths.

Ages were determined from pectoral fin cross sections following the technique used by Chilton and Beamish (1982). One fin from each fish was embedded in epoxy and then sectioned across its longitudinal axis near the base, using a Buehler Isomet low speed saw. The sections were mounted on microscope slides, examined at 10X power with transmitted light, and interpreted using the criteria described by Chilton and Beamish (1982).

Ages were determined from sagittal otolith cross sections following the technique used by Reist et al. (1995). One otolith from each of the frozen fish was cut through the nucleus, along the dorso-ventral axis, using surgical bone-cutting forceps. The exposed surfaces were ground and then polished with metallurgical lapping films, 30 and 0.3 µm grit, respectively. Each half was burned in an alcohol flame. The burned halves were supported by plasticine on microscope slides. Under a dissecting microscope, the burned cross sectional surfaces were coated with vegetable oil and examined using criteria described by Nordeng (1961) and Chilton and Beamish (1982).

Paired t-tests and regression analyses were used to compare the ages determined from fins with those determined from otoliths; lengths measured in the field with those measured in the laboratory; and weights measured in the field with those measured in the laboratory for broad whitefish and inconnu. Fish from the Ramparts and Little Chicago areas were lumped together for these analysis, which were performed using the Statistical Analysis System (SAS) software package, Version 6.09, on a MICROVAX Model 3100-80 computer.

Tissue metals analyses

Samples of broad whitefish and inconnu muscle, liver, and kidney were analysed for mercury, arsenic, and selenium at the Freshwater Institute Science Laboratory in Winnipeg. The analytical methods as described by R. Hunt (DFO, Winnipeg, pers. Comm.) follow.

All acids used in this study were trace metal analysis grade (concentrated) unless otherwise specified. All water was distilled and deionized. Commercial AA standards, reagent blanks, and standard reference materials were digested concurrently with the samples. Test tubes used for digestion were 25 x 200 mm pyrex glass and were washed with 10% nitric acid followed by deionized water prior to use. The aluminum block heater used for digestions was both time and temperature programmable. Standard reference materials (National Research Council) are analysed with each sample. The following summaries are intended to convey critical method parameters for publication rather than serve as a methods manual.

Mercury was analysed using the "hot block digestion--cold vapour atomic absorption method" (Hendzel and Jamieson 1976). A small sub-sample of wet tissue (0.2 g) was digested with 5 mL of 4:1 sulfuric:nitric acids at 180 °C for 12 h, cooled and diluted to 25 mL with water. Elemental mercury was released from this solution with a stannous chloride reductant and carried by a stream of air to a LDC model 3200 Mercury Monitor for atomic absorption detection (detection limit 0.01 $\mu g\ g^{-1}$).

Arsenic was analysed using the "borohydride reduction method" (Vijan and Wood 1974). A small sub-sample of wet tissue (0.8 g muscle, 0.4 g liver, 0.4 g kidney) was digested with nitric (4 mL), sulfuric (0.5 mL), and perchloric (1 mL) acids for 5 h at 130 °C, followed by 2 h at 200 °C. After addition of water (15 mL) and hydrochloric acid (7.5 mL), the solution was heated to 90 °C for 1 h, cooled and adjusted to 25 mL with water. Arsine gas was generated from this solution by the automated addition of 2% sodium borohydride and 10% potassium iodide solutions and swept by a nitrogen stream into an electrically heated quartz tube furnace (800°C) installed in the burner cavity of a Varian SpectrAA-20 atomic absorption spectrophotometer (detection limit 0.05 $ug\ g^{-1}$ for arsenic and selenium) .

Selenium was measured using the same techniques and instrumentation as arsenic, with the exception that the 10% potassium iodide solution was not added.

RESULTS

Species captured during the stock assessments included: Arctic charr (Salvelinus alpinus), Arctic cisco (Coregonus autumnalis), broad whitefish (Coregonus nanus), burbot (Lota lota), inconnu (Stenodus leucichthys), lake chub (Couesius plumbeus), lake whitefish (Coregonus clupeaformis), longnose sucker (Catostomus catostomus), northern pike (Esox lucius), and walleye (Stizostedion vitreum). The tentative identification of the Arctic charr--it may be Dolly Varden (S. malma), will be confirmed by meristic measurements in the laboratory. Biological data from the individual fish sampled are archived in Appendix 3. Unless otherwise noted, the age, data presented are from fins, and the length and weight are from field measurements.

A series of histograms illustrate the age-frequency distributions of broad whitefish and inconnu (Figures 3 to 5), and the length-frequency distributions of broad whitefish, inconnu, Arctic cisco, and northern pike (Figures 6 to 10).

The period and duration of each gillnet set, and the number and weight of each species caught in each set, are summarized by mesh size and sampling area in Tables 1 through 4. The number and weight of fish caught at each sampling area are summarized by season, gillnet mesh size, and species for each sampling area in Table 5. Catch per unit effort data are presented for each sampling area by season and gillnet mesh size in Table 6.

Age and growth composition data for each location are presented by season and sex for broad whitefish, inconnu, Arctic cisco, and northern pike in Tables 7 through 20.

Paired t-tests showed that the ages determined from fins were significantly ($P<0.01$) lower than those determined from otoliths for both broad whitefish and inconnu. The relationship between fin and otolith age was linear. The age difference increased with the age of the fish and was greater among broad whitefish than inconnu. Paired t-tests showed that both species shrink significantly ($P<0.01$) in length and weight following capture and freezing. The relationships between field and laboratory measurements were found to be linear over the size ranges of fish measured. Regression equations which describe the linear relationships between otolith and fin age and laboratory and field weight and length for broad whitefish and inconnu are presented in Table 21.

Biological and tissue metals data for individual fish are presented in Appendix 3.

Six workers from Fort Good Hope were trained in DFO sampling techniques during this phase of the project.

ACKNOWLEDGMENTS

Field work was ably conducted by Eddy Cook, Harry Harris, Wilfred Jackson, Daniel Jackson, Michel Lafferty, and Gene Rabesca of Fort Good Hope. We acknowledge their hard work and contribution to local fishing and river knowledge which made this project a success.

Jim Johnson, Carol Read, and Rick Wastle of DFO Winnipeg provided laboratory data on the

morphology and age of the fish; and Joanne Delaronde, Lyle and Susan Lockhart, Bob Hunt, and Don Metner of DFOI Winnipeg provided data on the laboratory analyses of the fishes tissues for heavy metals. Jim Johnson, Mary Layton and Carol Read of DFO and Cécile Stewart of Arctic Biological Consultants undertook careful reviews of the manuscript at various stages. Your participation has greatly strengthened this project and I thank you.

Funding for this research was provided by DFO through the Sahtu Implementation Funds. Special thanks to Wilfred Jackson, Sarah Masuzumi, and the Fort Good Hope Renewable Resource Council for administering the contract and supervising the project. Thanks also to Barney Masuzumi, Renewable Resource Officer, for his advice and support of the project.

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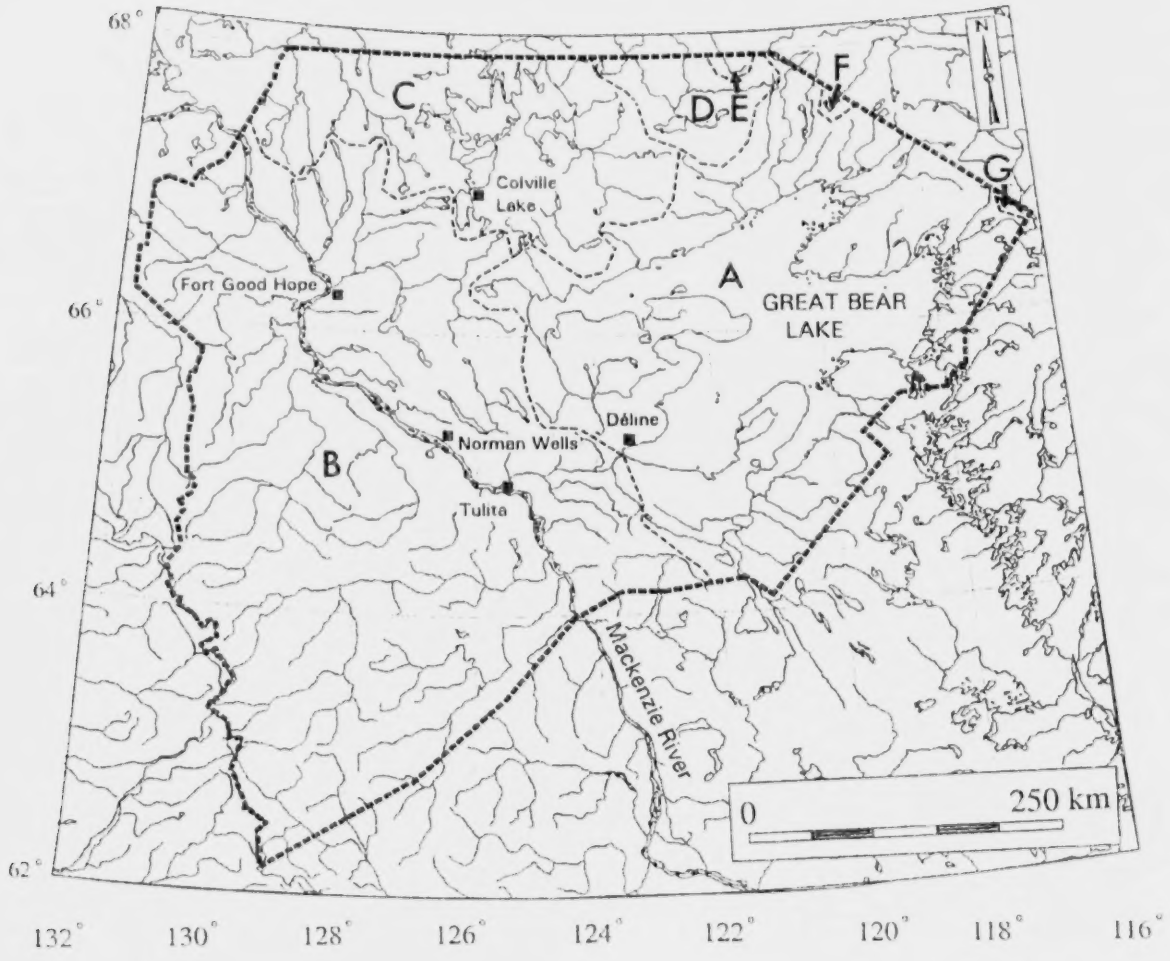


Figure 1. Map of the Sahtu Dene and Metis Settlement Area showing major rivers, drainage basins and communities. The drainage basins are coded by letter as follows: A. Great Bear Lake, B. Mackenzie River, C. Anderson River, D. Horton River, E. Hornaday River, F. Rae River, and G. Coppermine River.

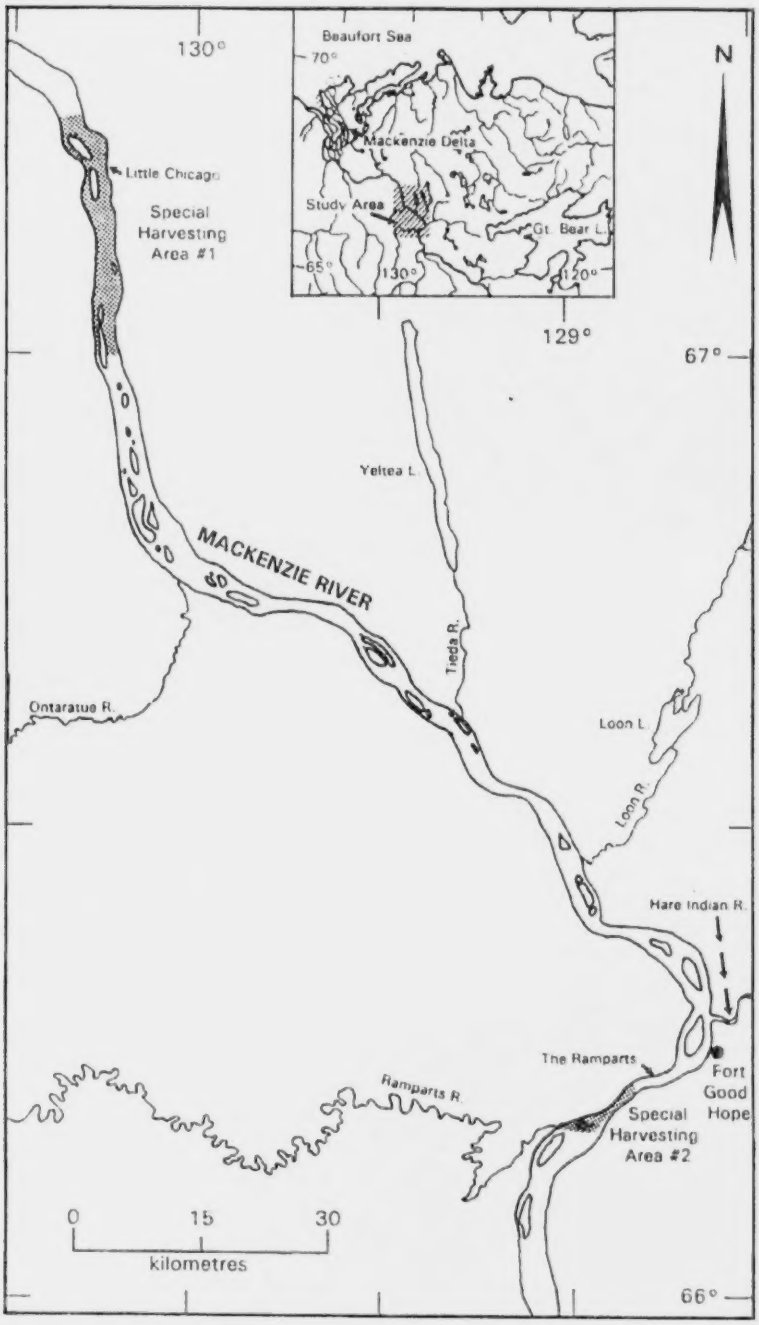


Figure 2 Map of the Mackenzie River showing the Little Chicago and Upper Ramparts Special Harvesting Areas.

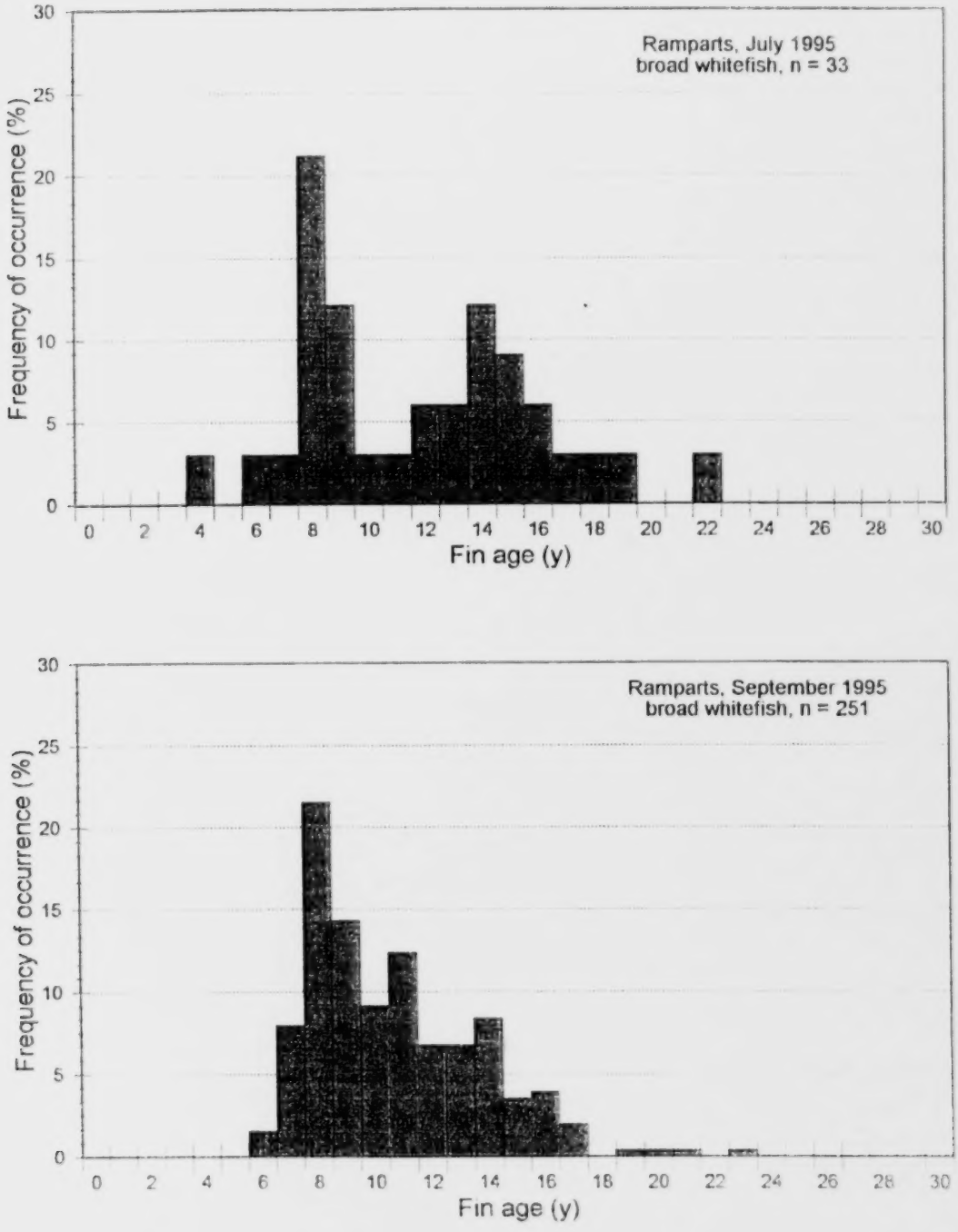


Figure 3. Age-frequency distributions of broad whitefish from the Upper Ramparts of the Mackenzie River.

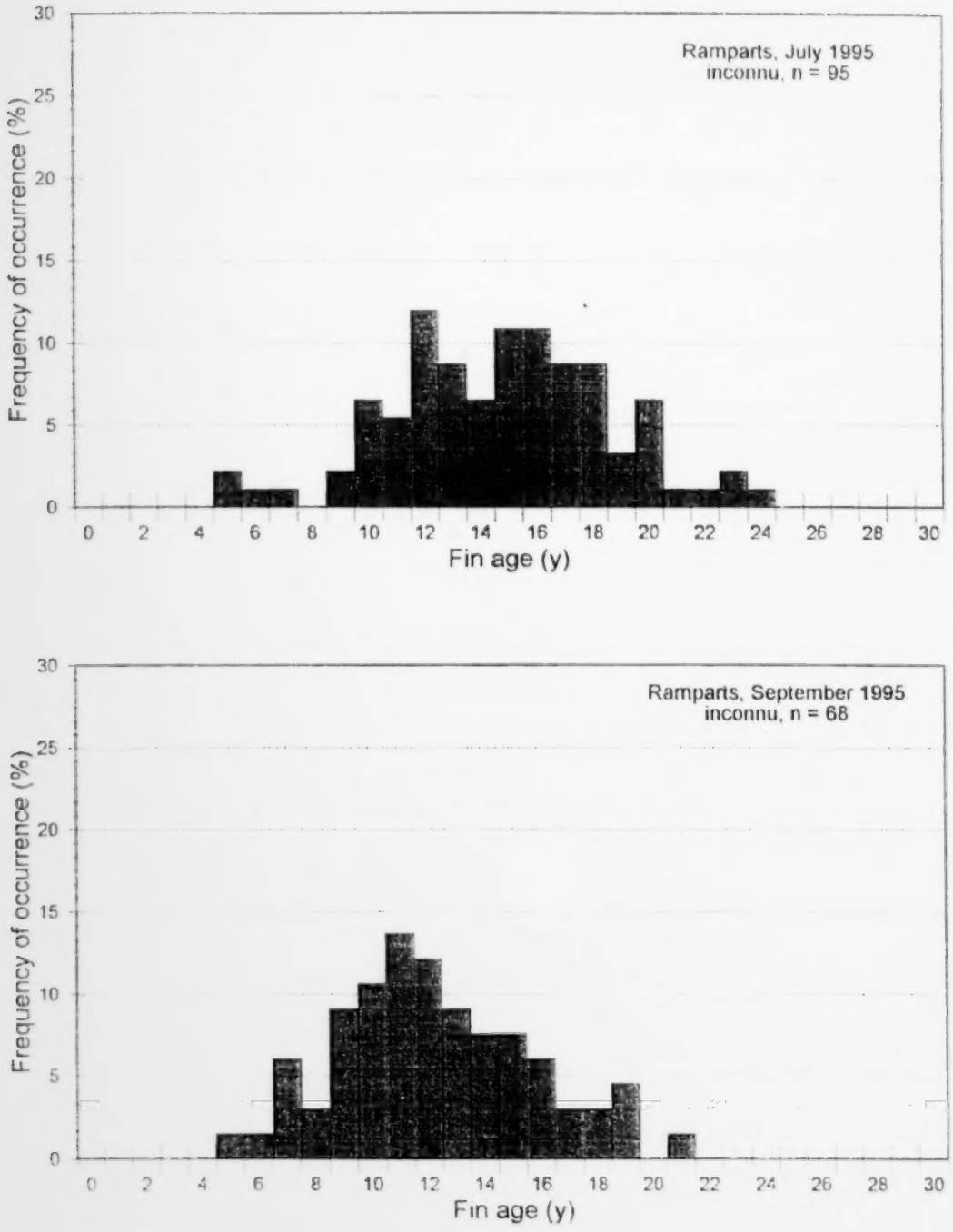
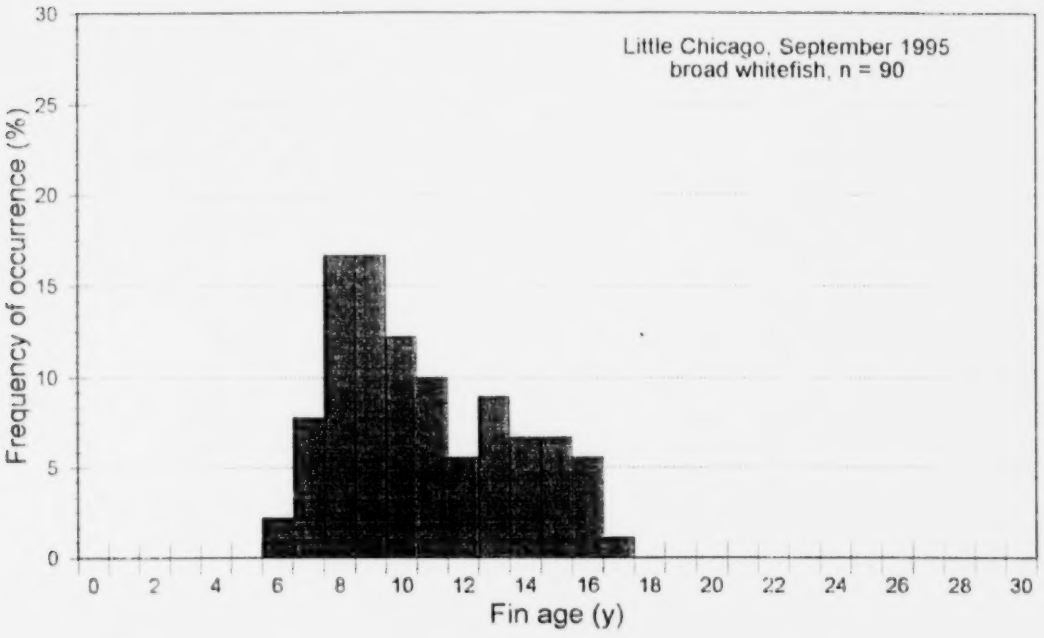


Figure 4 Age-frequency distributions of inconnu from the Upper Ramparts of the Mackenzie River.



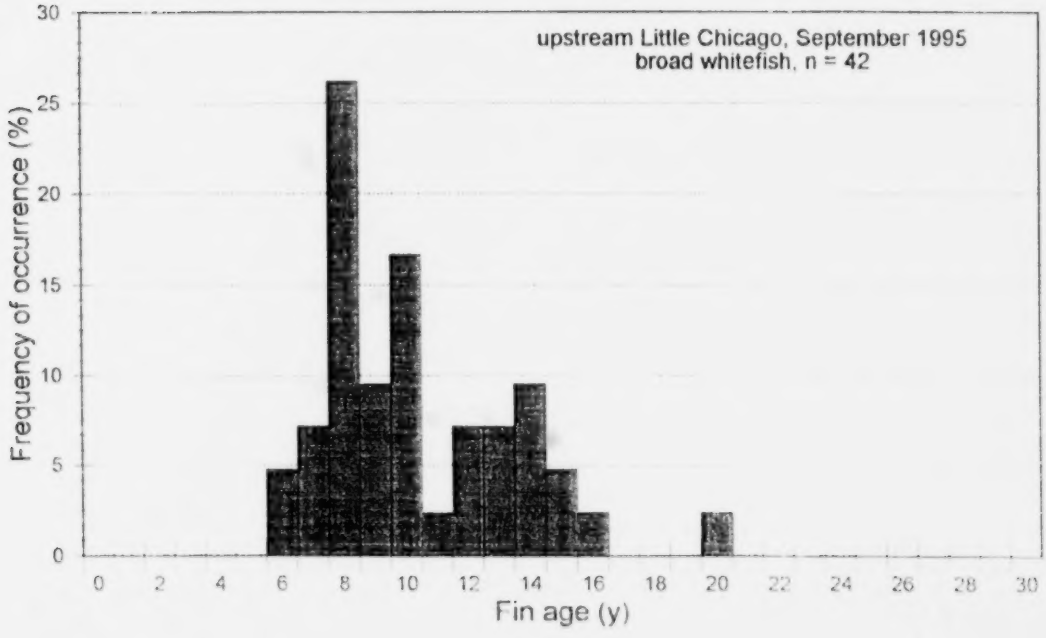


Figure 5. Age-frequency distributions of broad whitefish from the Little Chicago area of the Mackenzie River

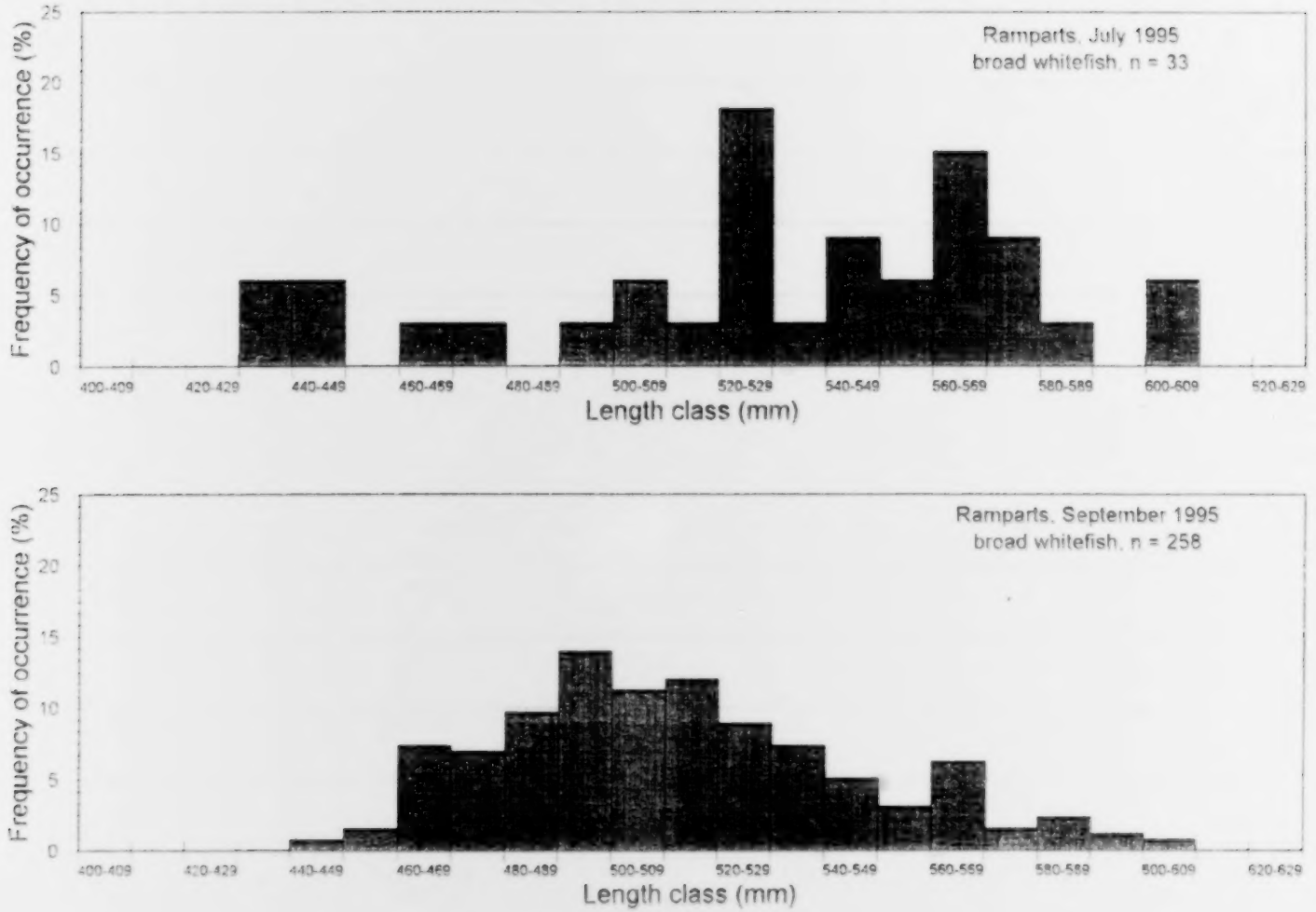


Figure 6. Length-frequency distributions of broad whitefish from the Upper Ramparts of the Mackenzie River.

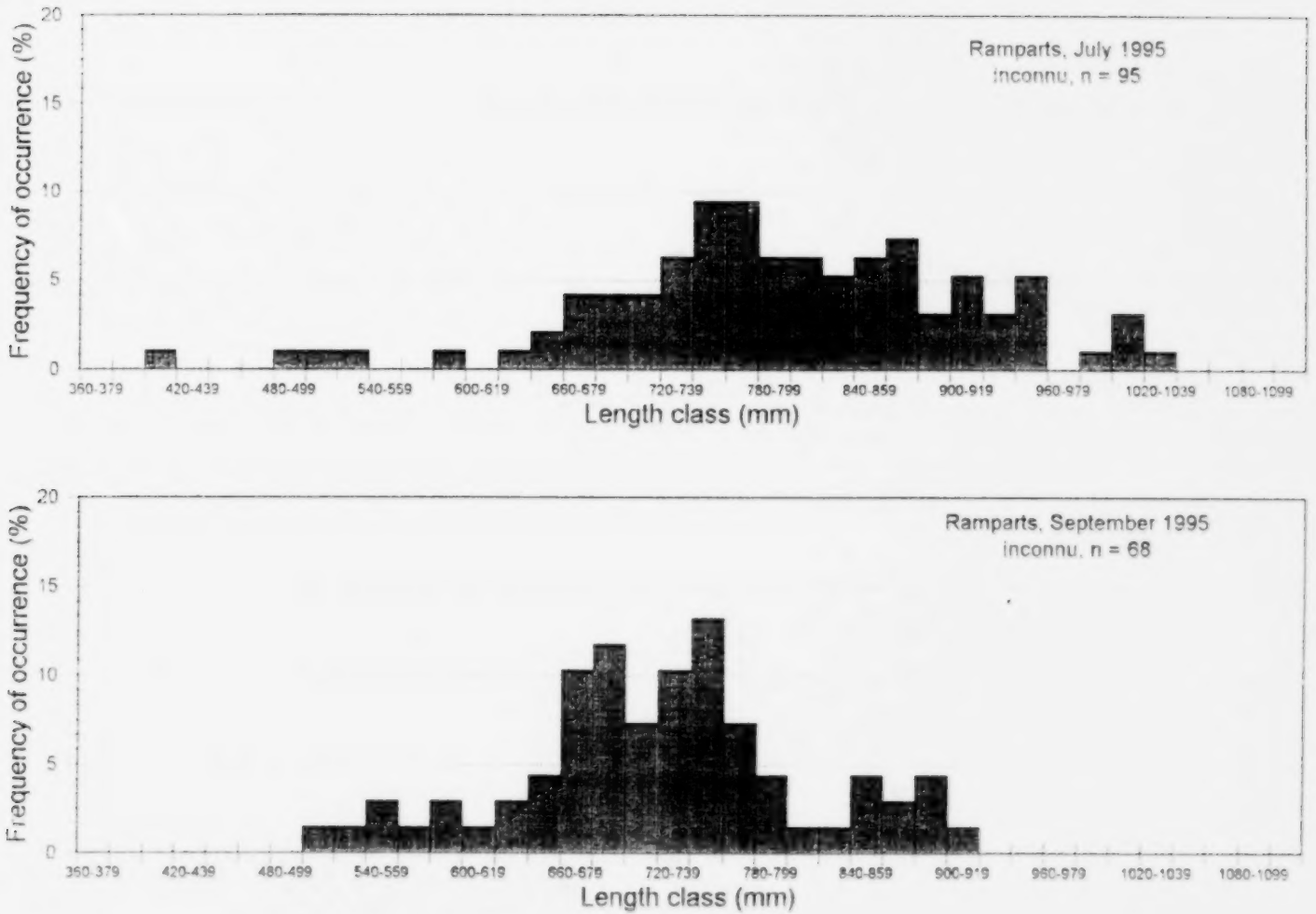


Figure 7. Length-frequency distributions of inconnu from the Upper Ramparts of the Mackenzie River.

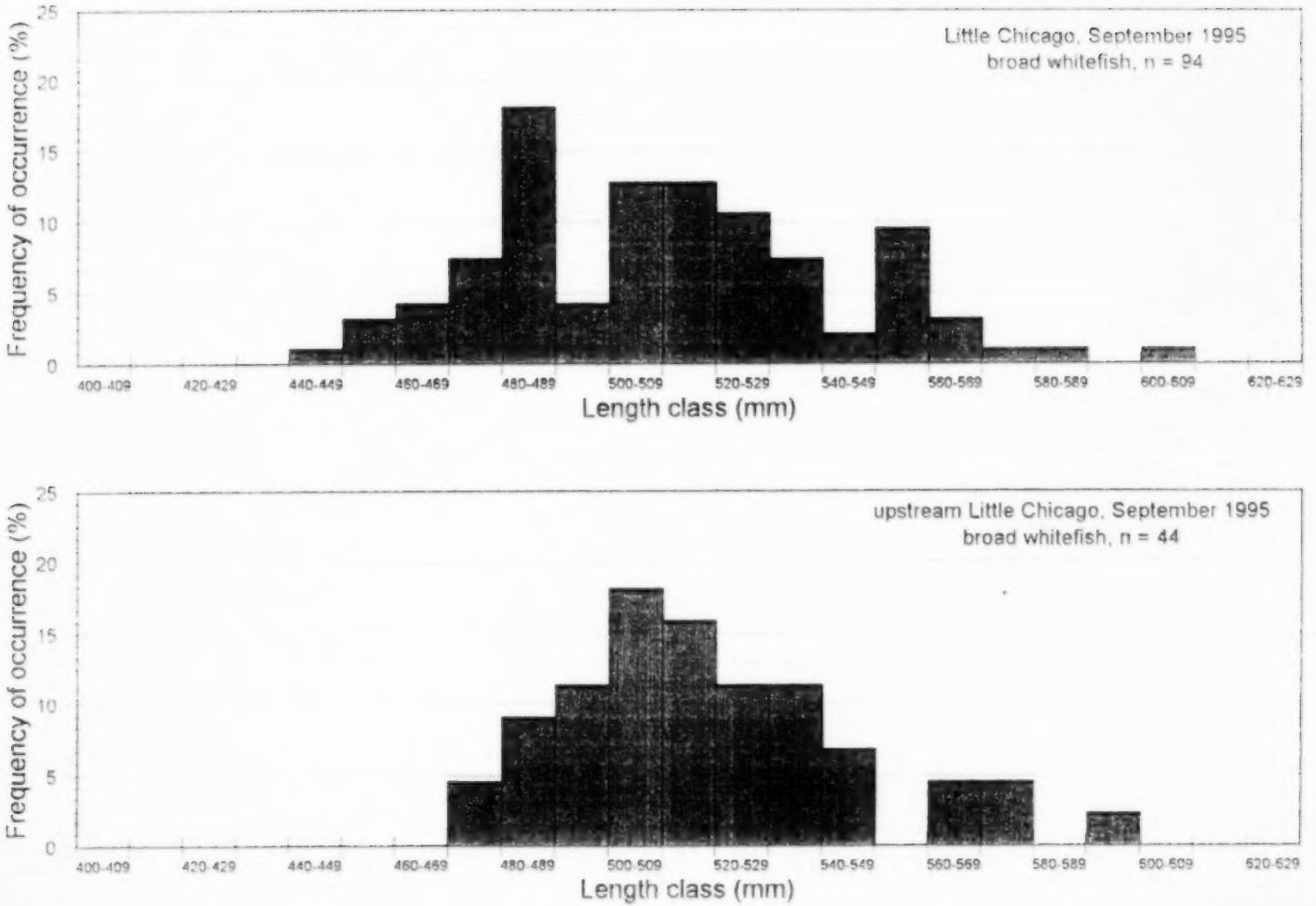


Figure 8. Length-frequency distributions of broad whitefish from the Little Chicago area of the Mackenzie River.

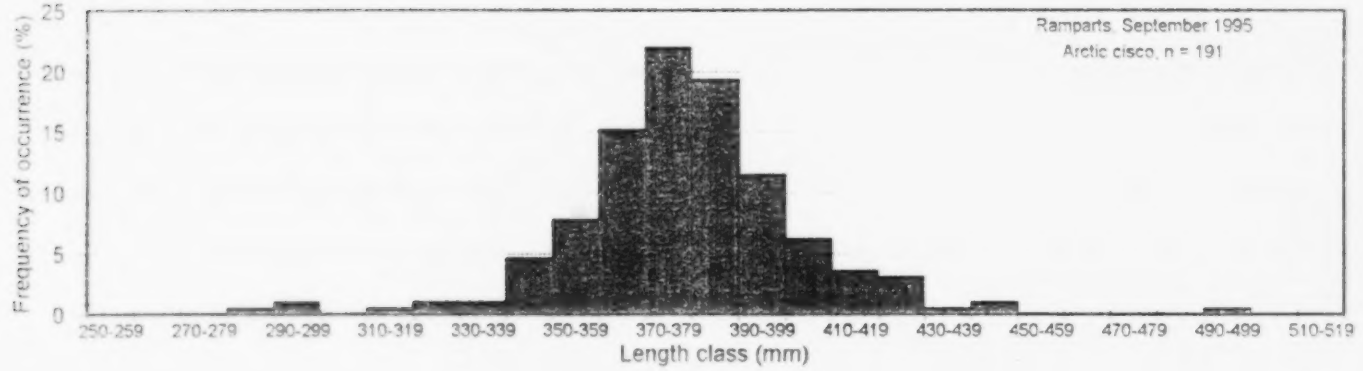


Figure 9. Length-frequency distribution of Arctic cisco from the Upper Ramparts of the Mackenzie River.

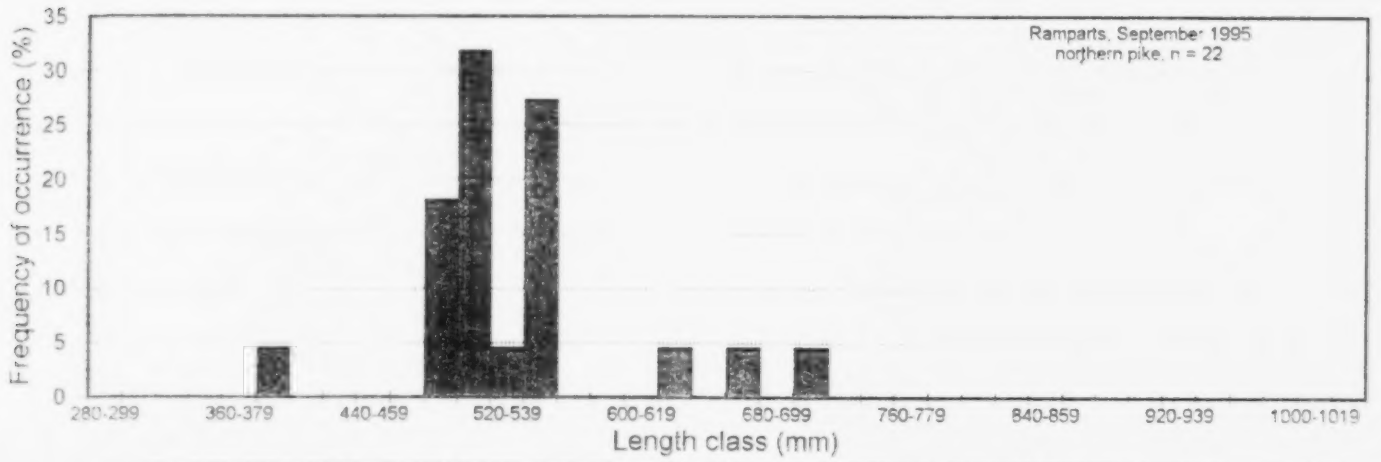


Figure 10. Length-frequency distribution of northern pike from the Upper Ramparts of the Mackenzie River.

Table 1. Summary by mesh size and species of gillnet set data from the Upper Ramparts of the Mackenzie River, July 1995.

SET #[3]	PERIOD AND DURATION OF GILLNET SET			NUMBER OF FISH CAUGHT [round weight in g]							
	Set date and (time)	Pull date and (time)	Hours fished (h)	Arctic cisco	broad whitefish	burbot	inconnu	lake chub	lake whitefish	longnose sucker	northern pike
89 mm MESH GILLNETS 22.9 m in LENGTH											
3	18 July (1015 h)	18 July (1945 h)	9.50[4] (9:30)				3 [24220]				2 [2100]
3	18 July (1945 h)	19 July (1945 h)	24.00 (24:00)				8 [35850]				4 [2673]
3	19 July (1945 h)	20 July (1620 h)	21.08 (21:05)				13 [48930]		1 [820]		1 [880]
3	20 July (1620 h)	21 July (2025 h)	27.92 (27:55)	3 [2380]	1 [3140]		6 [29460]				2 [1780]
3	21 July (2025 h)	22 July (1700 h)	20.58 (20:35)	1 [680]			1 [4940]		1 [1030]		
3	22 July (1700 h)	23 July (1530 h)	22.50 (22:30)	1 [870]	1 [1950]						
3	23 July (1530 h)	24 July (1955 h)	28.42 (28:25)		1 [1250]		1 [8500]		3 [2880]		
3	24 July (1955 h)	25 July (0955 h)	14.00 (14:00)	1 [730]			1 [6290]			2 [1780]	
3	25 July (0955 h)	26 July (1035 h)	23.33 (23:20)								
TOTAL			191.33 (191:20)	6 [4660]	3 [6340]	0	33 [158190]	0	5 [4730]	2 [1780]	9 [7433]
114 mm MESH GILLNETS 22.9 m in LENGTH											
2	18 July (0954 h)	18 July (1930 h)	9.60 (9:36)		1 [2270]		6 [46250]		2 [1540]	1 [1130]	
2	18 July (1930 h)	19 July (1954 h)	24.40 (24:24)		1 [2400]		4 [26860]		1 [650]		
2	19 July (1954 h)	20 July (1635 h)	20.68 (20:41)				2 [10260]	1 [60]	2 [1940]		
2	20 July (1635 h)	21 July (2035 h)	28.00 (28:00)				1 [11250]		2 [1690]		
2	21 July (2035 h)	22 July (1712 h)	20.62 (20:37)			1 [1250]	1 [4030]				
5	21 July (2000 h)	22 July (1726 h)	21.43 (21:26)		2 [5690]						
2	22 July (1712 h)	23 July (1540 h)	22.47 (22:28)								
5	22 July (1726 h)	23 July (1600 h)	22.57 (22:34)				1 [6330]				
2	23 July (1540 h)	24 July (2005 h)	28.42 (28:25)				1 [5160]				
5	23 July (1600 h)	24 July (2020 h)	28.33 (28:20)				1[1]			1 [1000]	
2	24 July (2005 h)	25 July (1000 h)	13.92 (13:55)								
5	24 July (2020 h)	25 July (1930 h)	23.17 (23:10)				3[2] [3430]				

Table 1. Continued.

SET #[3]	PERIOD AND DURATION OF GILLNET SET			NUMBER OF FISH CAUGHT [round weight in g]							
	Set date and (time)	Pull date and (time)	Hours fished (h)	Arctic cisco	broad whitefish	burbot	inconnu	lake chub	lake whitefish	longnose sucker	northern pike
2	25 July (1000 h)	26 July (0955 h)	23.92 (23:55)		1 [2450]		1 [8750]		1 [700]		
5	25 July (1930 h)	26 July (1125 h)	15.92 (15:55)		1 [1560]		1 [4790]				
TOTAL			303.43 (303:26)	0	6 [14370]	1 [1250]	22 [127110]	1 [60]	8 [6520]	2 [2130]	0
140 mm MESH GILLNETS 22.9 m in LENGTH											
1	18 July (0924 h)	18 July (1920 h)	9.93 (9:56)		1 [2480]		2 [10350]				
4	18 July (1420 h)	18 July (1951 h)	5.52 (5:31)				4 [16290]				
1	18 July (1920 h)	19 July (2004 h)	24.73 (24:44)		2 [3610]		3 [17860]				
4	18 July (1951 h)	19 July (1932 h)	23.32 (23:19)		1 [1980]		11 [59910]	1 [190]			
1	19 July (2004 h)	20 July (1650 h)	20.77 (20:46)		1 [2900]						
4	19 July (1932 h)	20 July (1614 h)	20.70 (20:42)		3 [8430]		3 [12580]				
1	20 July (1650 h)	21 July (2045 h)	27.92 (27:55)				2 [12120]				
4	20 July (1614 h)	21 July (2014 h)	28.00 (28:00)		1 [2440]		6 [45700]				
1	21 July (2045 h)	22 July (1720 h)	20.58 (20:35)		1 [1150]		1 [3450]				
4	21 July (2014 h)	22 July (1649 h)	20.58 (20:35)		3 [7510]		5 [29580]				
1	22 July (1720 h)	23 July (1555 h)	21.60 (22:35)								
4	22 July (1649 h)	23 July (1520 h)	22.52 (22:31)		2 [3940]						
1	23 July (1555 h)	24 July (2015 h)	28.33 (28:20)		2 [7230]						
4	23 July (1520 h)	24 July (1945 h)	28.42 (28:25)		3 [7270]						
1	24 July (2015 h)	25 July (1925 h)	23.17 (23:10)		1 [3600]		3 [17030]				
4	24 July (1945 h)	25 July (0945 h)	14.00 (14:00)		1[1]						
1	25 July (1925 h)	26 July (1105 h)	15.67 (15:40)		2 [4600]						
4	25 July (0945 h)	26 July (1015 h)	23.50 (23:30)		1 [1980]		3 [11180]				
TOTAL			379.23 (379:14)	0	25 [59120]	0	43 [236050]	1 [190]	0	0	0

[1] One missing fish weight. [2] Two missing fish weights.
[3] These numbers relate the data to the original sample sheets, they are not sample sites. [4] Hours are listed in metric (9.5) and English (9:30) forms.

Table 2. Summary by mesh size and species of gillnet set data from the Upper Ramparts of the Mackenzie River, September 1995.

SET #[3]	PERIOD AND DURATION OF GILLNET SET			NUMBER OF FISH CAUGHT [round weight in g]							
	Set date and (time)	Pull date and (time)	Hours fished (h)[4]	Arctic cisco	broad whitefish	burbot	inconnu	lake whitefish	longnose sucker	northern pike	walleye
89 mm MESH GILLNETS 22.9 m in LENGTH											
1	5 Sept. (2030 h)	6 Sept. (1100 h)	14.50 (14:30)	6 [3340]			1 [1300]			1 [740]	
2	6 Sept. (1100 h)	6 Sept (1630 h)	5.50 (5:30)	4 [2240]	1 [2230]		1 [5030]				
3	6 Sept. (1630 h)	6 Sept. (2115 h)	4.75 (4:45)	3 [1730]			1 [6650]			2 [1520]	
4,5	6 Sept. (2115 h)	7 Sept. (1729 h)	20.23 (20:14)	12 [7550]	2 [3670]	1 [940]	2 [5520]	1 [580]		2 [1990]	
6	7 Sept. (1729 h)	7 Sept. (2135 h)	4.10 (4:06)	5[1] [3710]	1 [2100]					1 [1040]	
7	7 Sept. (2135 h)	8 Sept. (0936 h)	12.02 (12:01)	13[2] [7480]	1 [1800]		1 [4760]				
8	8 Sept. (0936 h)	8 Sept. (1735 h)	7.98 (7:59)	11 [10040]	2 [3930]		1 [3880]				
9	8 Sept. (1735 h)	8 Sept. (2145 h)	4.17 (4:10)	2 [1080]			1 [3790]				
10	8 Sept. (2145 h)	9 Sept. (0929 h)	11.73 (11:44)	15 [8180]	2 [3180]		1 [3500]			1 [1100]	
11	9 Sept. (0929 h)	9 Sept. (1732 h)	8.03 (8:03)	6 [3180]	1 [1910]		1 [2880]				
12	9 Sept. (1732 h)	9 Sept. (2145 h)	4.22 (4:13)	5 [2730]	1 [1710]					1 [860]	
13	9 Sept. (2145 h)	10 Sept. (1025 h)	12.67 (12:40)	21 [12340]	2 [3510]						
14	10 Sept. (1025 h)	10 Sept. (1720 h)	6.92 (6:55)	4 [2820]	5 [10040]						
15	10 Sept. (1720 h)	10 Sept. (2125 h)	4.08 (4:05)	3 [2320]	1 [1510]		3 [11190]			2 [1730]	
16	10 Sept. (2135 h)	11 Sept. (1027 h)	12.87 (12:52)	18 [10630]	2 [3490]					2 [2010]	
17	11 Sept. (1024 h)	11 Sept. (2136 h)	11.20 (11:12)	1 [510]	1 [1930]		1 [3550]			2 [2450]	
18	11 Sept. (2136 h)	12 Sept. (1148 h)	14.20 (14:12)	17 [9250]	2 [3940]						
19	12 Sept. (1148 h)	12 Sept. (2225 h)	10.62 (10:37)	5 [2640]	5 [9320]		1 [2860]			1 [920]	
20	12 Sept. (2225 h)	13 Sept. (1145 h)	13.33 (13:20)	11 [6650]	5 [10420]					1 [1180]	
21	13 Sept. (1145 h)	13 Sept. (2225 h)	10.67 (10:40)	1 [740]	2 [4480]		1 [3210]				
22	13 Sept (2225 h)	14 Sept. (1115 h)	12.83 (12:50)	18 [10090]	1 [1180]					1 [1870]	
23	14 Sept. (1115 h)	14 Sept. (2159 h)	10.73 (10:44)	3 [3700]						1 [2180]	

Table 2. Continued.

SET #[3]	PERIOD AND DURATION OF GILLNET SET			NUMBER OF FISH CAUGHT [round weight in g]							
	Set date and (time)	Pull date and (time)	Hours fished (h)[4]	Arctic cisco	broad whitefish	burbot	inconnu	lake whitefish	longnose sucker	northern pike	walleye
TOTAL			168.27	184 [112930]	37 [70350]	1 [940]	16 [58120]	1 [580]	0	18 [19590]	0
114 mm MESH GILLNETS 22.9 m in LENGTH											
1	5 Sept. (2100 h)	6 Sept. (1110 h)	14.17 (14:10)	1 [760]	5 [8720]		1 [1440]	1 [660]			
2	6 Sept. (1110 h)	6 Sept. (1640 h)	5.50 (5:30)		1 [2340]		2 [11670]	1 [1020]			
3	6 Sept. (1640 h)	6 Sept. (2130 h)	4.83 (4:50)		7 [13870]		2 [7690]				
4	6 Sept. (2130 h)	7 Sept. (0945 h)	12.25 (12:15)		7 [15630]						
5	7 Sept. (0945 h)	7 Sept. (1744 h)	7.98 (7:59)	2 [1400]	4 [6900]		1 [2120]				
6	7 Sept. (1744 h)	7 Sept. (2150 h)	4.10 (4:06)		1 [1940]						
7	7 Sept. (2150 h)	8 Sept. (0954 h)	12.07 (12:04)	1 [260]	3 [4830]				1 [940]		
8	8 Sept. (0954 h)	8 Sept. (1759 h)	8.07 (8:04)		3 [7100]					1 [1980]	
9	8 Sept. (1759 h)	8 Sept. (2159 h)	4.00 (4:00)		1 [1470]		1 [7410]				
10	8 Sept. (2159 h)	9 Sept. (0946 h)	11.78 (11:47)		3 [6860]		2 [6880]				
11	9 Sept. (0946 h)	9 Sept. (1749 h)	8.05 (8:03)				5 [22110]				
12	9 Sept. (1749 h)	9 Sept. (2200 h)	4.18 (4:11)		1 [1940]		1 [3230]				
13	9 Sept. (2200 h)	10 Sept. (1045 h)	12.75 (12:45)		4 [9140]						
14	10 Sept. (1045 h)	10 Sept. (1744 h)	6.98 (6:59)				1 [8170]				
15	10 Sept. (1744 h)	10 Sept. (2146 h)	4.03 (4:02)	1 [1080]	6 [11590]						
16	10 Sept. (2146 h)	11 Sept. (1047 h)	13.02 (13:01)		7 [13200]						1 [790]
17	11 Sept. (1047 h)	11 Sept. (2157 h)	11.17 (11:10)		6 [12440]		1 [1960]				
18	11 Sept. (2157 h)	12 Sept. (1202 h)	14.08 (14:05)		7 [16030]		1 [1330]				
19	12 Sept. (1202 h)	12 Sept. (2245 h)	10.72 (10:43)		2 [4140]		2 [8910]				
20	12 Sept. (2245 h)	13 Sept. (1204 h)	13.32 (13:19)		6 [12610]		1 [7130]				
21	13 Sept. (1204 h)	13 Sept. (2247 h)	10.72 (10:43)								

Table 2. Continued.

SET #[3]	PERIOD AND DURATION OF GILLNET SET			NUMBER OF FISH CAUGHT [round weight in g]							
	Set date and (time)	Pull date and (time)	Hours fished (h)[4]	Arctic cisco	broad whitefish	burbot	inconnu	lake whitefish	longnose sucker	northern pike	walleye
TOTAL			193.77	5 [3500]	74 [150750]	0	21 [90050]	2 [1680]	1 [940]	1 [1980]	1 [790]
140 mm MESH GILLNETS 22.9 m in LENGTH											
1	5 Sept. (2000 h)	6 Sept. (1030 h)	14.50 (14:30)		6 [14540]		1 [6750]			1 [390]	
2	6 Sept. (1030 h)	6 Sept. (1615 h)	5.75 (5:45)								
3	6 Sept. (1615 h)	6 Sept. (2100 h)	4.75 (4:45)		1 [1780]						
4	6 Sept. (2100 h)	7 Sept. (0914 h)	12.23 (12:14)	1 [550]	5 [9730]						
5	7 Sept. (0914 h)	7 Sept. (1715 h)	8.02 (8:01)		2 [3560]						
6	7 Sept. (1715 h)	7 Sept. (2120 h)	4.08 (4:05)		2 [5510]						
7	7 Sept. (2120 h)	8 Sept. (0920 h)	12.00 (12:00)				1 [4070]				
8	8 Sept. (0920 h)	8 Sept. (1715 h)	7.92 (7:55)		1 [1670]						
9	8 Sept. (1715 h)	8 Sept. (2130 h)	4.25 (4:15)		2 [3890]						
10	8 Sept. (2130 h)	9 Sept. (0915 h)	11.75 (11:45)		4 [8600]		1 [4360]				
11	9 Sept. (0915 h)	9 Sept. (1714 h)	7.98 (7:59)		3 [6390]		1 [5220]				
12	9 Sept. (1714 h)	9 Sept. (2120 h)	4.10 (4:06)		9 [17220]		2 [7520]				
13	9 Sept. (2120 h)	10 Sept. (1000 h)	12.67 (12:40)		2 [4280]		4 [13170]				
14	10 Sept. (1000 h)	10 Sept. (1710 h)	7.17 (7:10)		7 [16120]		3 [11330]				
15	10 Sept. (1710 h)	10 Sept. (2100 h)	3.83 (3:50)		11 [22530]		6 [29820]				
16	10 Sept. (2100 h)	11 Sept. (1000 h)	13.00 (13:00)		14 [31770]		1 [2650]				
17	11 Sept. (1000 h)	11 Sept. (2120 h)	11.33 (11:20)		15 [31430]	1 [2740]	4 [15050]				
18	11 Sept. (2120 h)	12 Sept. (1130 h)	14.17 (14:10)		13 [32120]		1 [2460]				
19	12 Sept. (1130 h)	12 Sept. (2210 h)	10.67 (10:40)		11 [22770]		4 [16380]				
20	12 Sept. (2210 h)	13 Sept. (1130 h)	13.33 (13:20)	1 [340]	13 [30050]		1 [4370]			2 [4260]	
21	13 Sept. (1130 h)	13 Sept. (2215 h)	10.75 (10:45)		9 [18410]						

Table 2. Continued.

SET #[3]	PERIOD AND DURATION OF GILLNET SET			NUMBER OF FISH CAUGHT [round weight in g]							
	Set date and (time)	Pull date and (time)	Hours fished (h)[4]	Arctic cisco	broad whitefish	burbot	inconnu	lake whitefish	longnose sucker	northern pike	walleye
23	13 Sept. (2215 h)	14 Sept. (1047 h)	12.53 (12:32)		12 [25310]	1 [1830]	1 [5160]				
23	14 Sept. (1047 h)	14 Sept. (2145 h)	10.97 (10:58)		5 [22980]						
TOTAL			217.75	2 [890]	147 [330660]	2 [4570]	31 [128310]	0	0	3 [4650]	0

[1] One missing fish weight. [2] Two missing fish weights.
[3] These numbers relate the data to the original sample sheets, they are not sample sites.
[4] Hours are listed in metric (14.5) and English (14:30) forms.

Table 3. Summary by mesh size and species of gillnet set data from the Little Chicago area of the Mackenzie River, September 1995.

PERIOD AND DURATION OF GILLNET SET			NUMBER OF FISH CAUGHT (round weight in g)			
Set date and (time)	Pull date and (time)	Hours fished (h)	Arctic charr	broad whitefish	inconnu	lake whitefish
114 mm MESH GILLNETS 22.9 m in LENGTH						
7 Sept. (1410 h)	7 Sept. (2035 h)	6.42 (6:25)		3 [6910]	3 [9850]	
7 Sept. (2035 h)	8 Sept. (1850 h)	22.25 (22:15)		8 [16880]	2 [9840]	
8 Sept. (1850 h)	9 Sept. (2145 h)	2.92 (2:55)		21 [38490]	1 [860]	
9 Sept. (2145 h)	10 Sept. (1945 h)	22.00 (22:00)		3 [5690]	2 [6720]	2 [1690]
TOTAL		53.58 (53:35)	0	35 [67970]	8 [27270]	2 [1690]
140 mm MESH GILLNETS 22.9 m in LENGTH						
6 Sept. (1200 h)	6 Sept. (2100 h)	9.00 (9:00)		11 [22761]	3 [9290]	
6 Sept. (2100 h)	7 Sept. (2025 h)	23.42 (23:25)		16 [32430]	2 [6070]	
7 Sept. (2025 h)	8 Sept. (1953 h)	23.47 (23:28)		16 [31130]		
8 Sept. (1953 h)	9 Sept. (2054 h)	25.02 (25:01)	1 [3650]	16 [36500]	1 [2130]	
TOTAL		80.90 (80:54)	1 [3650]	59 [122821]	6 [17490]	0

Table 4. Summary by mesh size and species of gillnet set data from upstream of the Little Chicago area of the Mackenzie River, September 1995.

PERIOD AND DURATION OF GILLNET SET			NUMBER OF FISH CAUGHT (round weight in g)				
Set date and (time)	Pull date and (time)	Hours fished (h)	broad whitefish	burbot	inconnu	lake whitefish	northern pike
114 mm MESH GILLNETS 22.9 mm in LENGTH							
11 Sept. (1000 h)	11 Sept. (1945 h)	9.75 (9:45)			1 [1210]		
11 Sept. (1945 h)	12 Sept. (2100 h)	25.25 (25:15)	4 [9150]		1 [1720]	1 [870]	
12 Sept. (2100 h)	13 Sept. (2105 h)	24.08 (24:05)	27 [56300]	1 [1610]			
13 Sept. (2105 h)	14 Sept. (1940 h)	22.58 (22:35)	11 [20900]				1 [7050]
14 Sept. (1940 h)	15 Sept. (1030 h)	14.83 (14:50)	2 [9260]				
TOTAL		96.50 (96:30)	44 [95610]	1 [1610]	2 [2930]	1 [870]	1 [7050]

Table 5. Summary by season, gillnet mesh size, and species of the number and round weight of fish caught at each Special Harvesting Area.

MESH SIZE (mm)	NUMBER OF FISH CAUGHT [round weight in g]										TOTAL
	Arctic charr	Arctic cisco	broad whitefish	burbot	inconnu	lake chub	lake whitefish	longnose sucker	northern pike	walleye	
UPPER RAMPARTS, 18-26 JULY 1995											
89 mm	-	6 [4660]	3 [6340]	-	33 [158190]	-	5 [4730]	2 [1780]	9 [7433]	-	58 [183133]
114 mm	-	-	6 [14370]	1 [1250]	22 [127110]	1 [60]	8 [6520]	2 [2130]	-	-	39 [151440]
140 mm	-	-	25 [59120]	-	43 [236050]	1 [190]	-	-	-	-	67 [295360]
TOTAL	0	6 [4660]	34 [79830]	1 [1250]	98 [521350]	2 [250]	13 [11250]	4 [3910]	9 [7433]	0	167 [629933]
UPPER RAMPARTS, 5-14 SEPTEMBER 1995											
89 mm	-	184 [112930]	37 [70350]	1 [940]	16 [58120]	-	1 [580]	-	18 [19590]	-	257 [262510]
114 mm	-	5 [3500]	74 [150750]	-	21 [90050]	-	2 [1680]	1 [940]	1 [1980]	1 [790]	105 [249690]
140 mm	-	2 [890]	147 [330660]	2 [4570]	31 [128310]	-	-	-	3 [4650]	-	185 [469080]
TOTAL	0	191 [117320]	258 [551760]	3 [5510]	68 [276480]	0	3 [2260]	1 [940]	22 [26220]	1 [790]	547 [981280]
LITTLE CHICAGO, 6-10 SEPTEMBER 1995											
114 mm	-	-	35 [67970]	-	8 [27270]	-	2 [1690]	-	-	-	45 [96930]
140 mm	1 [3650]	-	59 [122821]	-	6 [17490]	-	-	-	-	-	66 [143961]
TOTAL	1 [3650]	0	94 [190791]	0	14 [44760]	0	2 [1690]	0	0	0	111 [240891]
UPSTREAM FROM LITTLE CHICAGO, 11-15 SEPTEMBER											
14 mm	0	0	44 [95610]	1 [1610]	2 [2930]	0	1 [870]	0	1 [7050]	0	49 [108070]

Table 6. Summary by season and gillnet mesh size of the number and round weight (kg) of fish caught per unit (100 m of gillnet set for 24 h) of sampling effort (CPUE) at each Special Harvesting Area.

MESH SIZE (mm)	CPUE (fish/100 m of gillnet set 24 h)			CPUE (kg/100 m of gillnet set 24 h)		
	Range	Mean	STD	Range	Mean	STD
UPPER RAMPARTS, 18-26 JULY 1995						
89 mm	0-75	33	25	0-290	110	104
114 mm	0-109	18	27	0-559	72	144
140 mm	0-76	22	20	0-309	90	94
TOTAL	0-109	23	24	0-559	89	113
UPPER RAMPARTS, 5-14 SEPTEMBER 1995						
89 mm	39-231	129	53	39-430	145	80
114 mm	0-196	63	46	0-468	157	108
140 mm	0-465	98	104	0-1432	254	301
TOTAL	0-465	97	78	0-1432	187	164
LITTLE CHICAGO, 6-10 SEPTEMBER 1995						
114 mm	33-790	242	366	67-1412	470	634
140 mm	71-163	98	44	139-373	215	107
TOTAL	33-790	170	253	67-1412	343	443
UPSTREAM FROM LITTLE CHICAGO, 11-15 SEPTEMBER						
114 mm	11-122	45	46	13-252	102	94

Table 7. Biological data by age class for broad whitefish taken by survey gillnets at the Upper Ramparts of the Mackenzie River, July 1995.

AGE	MALES							FEMALES							TOTAL					
(y)		Length (mm)		Weight (g)		K	Mat (%)		Length (mm)		Weight (g)		K	Mat (%)		Length (mm)		Weight (g)		K
	n	mean	SD	mean	SD			n	mean	SD	mean	SD			n	mean	SD	mean	SD	
4	1	440	-	1300	-	1.53	100	-	-	-	-	-	-	-	1	440	-	1300	-	1.53
6	1	430	-	1150	-	1.45	100	-	-	-	-	-	-	-	1	430	-	1150	-	1.45
7	1	570	-	2450	-	1.32	100	-	-	-	-	-	-	-	1	570	-	2450	-	1.32
8	4	489	53	1970	838	1.61	100	2	480	14	1900	481	1.70	100	7	480	41	1864	662	1.63
9	3	563	15	3220	354	1.80	100	1	545	-	3020	-	1.87	100	4	559	15	3170	306	1.82
10	1	500	-	1560	-	1.25	100	-	-	-	-	-	-	-	1	500	-	1560	-	1.25
11	-	-	-	-	-	-	-	1	525	-	2280	-	1.58	100	1	525	-	2280	-	1.58
12	2	533	25	2440	651	1.60	100	-	-	-	-	-	-	-	2	533	25	2440	651	1.60
13	1	565	-	3050	-	1.69	100	1	560	-	3250	-	1.85	100	2	563	4	3150	141	1.77
14	3	550	44	2637	1203	1.52	100	1	525	-	2480	-	1.71	100	4	544	38	2598	985	1.57
15	3	557	15	2520	584	1.45	100	-	-	-	-	-	-	-	3	557	15	2520	584	1.45
16	1	520	-	2380	-	1.69	100	1	500	-	1980	-	1.58	100	2	510	14	2180	283	1.64
17	-	-	-	-	-	-	-	1	560	-	3550	-	2.02	100	1	560	-	3550	-	2.02
18	1	570	-	2960	-	1.60	100	-	-	-	-	-	-	-	1	570	-	2960	-	1.60
19	1	520	-	1950	-	1.39	100	-	-	-	-	-	-	-	1	520	-	1950	-	1.39
22	1	600	-	3410	-	1.58	100	-	-	-	-	-	-	-	1	600	-	3410	-	1.58
TOTAL	24							8							33					
MEAN		531	49	2421	801	1.56			522	33	2545	675	1.75			526	47	2419	774	1.60
MEAN AGE	11.9							12.0							11.8					

Table 8. Biological data by length interval for broad whitefish taken by survey gillnets at the Upper Ramparts of the Mackenzie River, July 1995.

LENGTH INTERVAL (mm)	MALES						FEMALES						TOTAL				
		Length (mm)	Weight (g)		K	Mat (%)		Length (mm)	Weight (g)		K	Mat (%)		Length (mm)	Weight (g)		K
	n	mean	mean	SD			n	mean	mean	SD			n	mean	mean	SD	
430-439	2	430	1200	71	1.51	100	-	-	-	-	-	-	2	430	1200	71	1.51
440-449	1	440	1300	-	1.53	100	-	-	-	-	-	-	2	443	1335	49	1.54
460-469	1	460	1290	-	1.33	100	-	-	-	-	-	-	1	460	1290	-	1.33
470-479	-	-	-	-	-	-	1	470	1560	-	1.50	100	1	470	1560	-	1.50
490-499	-	-	-	-	-	-	1	490	2240	-	1.90	100	1	490	2240	-	1.90
500-509	1	500	1560	-	1.25	100	1	500	1980	-	1.58	100	2	500	1770	297	1.42
510-519	1	515	1980	-	1.45	100	-	-	-	-	-	-	1	515	1980	-	1.45
520-529	4	520	2098	358	1.49	100	2	525	2380	141	1.64	100	6	522	2192	320	1.54
530-539	1	530	2270	-	1.52	100	-	-	-	-	-	-	1	530	2270	-	1.52
540-549	2	543	2460	679	1.54	100	1	545	3020	-	1.87	100	3	543	2647	579	1.65
550-559	2	550	3030	184	1.82	100	-	-	-	-	-	-	2	550	3030	184	1.82
560-569	3	562	2797	318	1.58	100	2	560	3400	212	1.94	100	5	561	3038	413	1.72
570-579	3	570	2850	358	1.54	100	-	-	-	-	-	-	3	570	2850	358	1.54
580-589	1	580	3600	-	1.85	100	-	-	-	-	-	-	1	580	3600	-	1.85
600-609	2	600	3695	403	1.71	100	-	-	-	-	-	-	2	600	3695	403	1.71
TOTAL	24						8						33				
MEAN		531	2421	801	1.56			522	2545	675	1.75			526	2419	774	1.60

Table 9. Biological data by age class for inconnu taken by survey gillnets at the Upper Ramparts of the Mackenzie River, July 1995.

AGE	MALES							FEMALES							TOTAL					
(y)	Length (mm)			Weight (g)		K	Mat (%)	Length (mm)			Weight (g)		K	Mat (%)	Length (mm)			Weight (g)		K
	n	mean	SD	mean	SD			n	mean	SD	mean	SD			n	mean	SD	mean	SD	
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	503	25	1150	212	0.90
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	400	-	640	-	1.00
7	1	690	-	3500	-	1.07	100	-	-	-	-	-	-	-	1	690	-	3500	-	1.07
9	1	660	-	2790	-	0.97	100	-	-	-	-	-	-	-	2	705	64	3495	997	0.98
10	2	683	18	2985	488	0.93	100	1	730	-	4420	-	1.14	100	6	678	86	3758	937	1.29
11	3	678	10	3400	26	1.09	100	-	-	-	-	-	-	-	5	685	34	3400	587	1.05
12	6	734	24	3925	412	0.99	100	4	810	52	5865	1250	1.09	100	11	754	60	4501	1377	1.02
13	1	760	-	4400	-	1.00	100	2	785	21	5145	445	1.07	100	8	734	51	4093	926	1.02
14	3	718	18	3493	167	0.94	100	-	-	-	-	-	-	-	6	769	69	4557	1393	0.98
15	3	783	16	4437	349	0.92	100	1	785	-	5220	-	1.08	100	10	790	27	4946	748	1.00
16	-	-	-	-	-	-	-	3	868	19	7043	326	1.08	100	10	825	46	5811	1154	1.02
17	3	802	48	5287	1040	1.02	100	2	885	78	7250	1952	1.03	100	8	838	61	5191	2182	0.90
18	2	860	57	6350	665	1.00	100	4	931	15	8343	322	1.03	100	8	906	41	7568	986	1.01
19	-	-	-	-	-	-	-	2	905	21	7480	537	1.01	100	3	800	182	7820	701	2.05
20	-	-	-	-	-	-	-	2	970	85	10140	2121	1.11	100	6	941	60	9187	1946	1.09
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1010	-	15200	-	1.48
22	-	-	-	-	-	-	-	1	875	-	7250	-	1.08	100	1	875	-	7250	-	1.08
23	-	-	-	-	-	-	-	1	1000	-	11050	-	1.11	100	2	935	92	8795	3189	1.05
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1003	-	11240	-	1.11
TOTAL	25							23							92					
MEAN		742	60	4110	1043	0.99			872	78	7214	1893	1.02			790	115	5457	2487	1.07
MEAN AGE	13.1							16.3							14.7					

Table 10. Biological data by length interval for inconnu taken by survey gillnets at the Upper Ramparts of the Mackenzie River, July 1995.

LENGTH INTERVAL (mm)	MALES						FEMALES						TOTAL			
		Length(mm)	Weight(g)		K	Mat (%)		Length(mm)	Weight(g)		K	Mat (%)		Length(mm)	Weight(g)		K
	n	mean	mean	SD			n	mean	mean	SD			n	mean	mean	SD	
400-419	-	-	-	-	-	-	-	-	-	-	-	-	1	400	640	-	1.00
480-499	-	-	-	-	-	-	-	-	-	-	-	-	1	485	1000	-	0.88
500-519	-	-	-	-	-	-	-	-	-	-	-	-	1	515	3430	-	2.51
520-539	-	-	-	-	-	-	-	-	-	-	-	-	1	520	1300	-	0.92
580-599	-	-	-	-	-	-	-	-	-	-	-	-	1	590	8500	-	4.14
620-639	-	-	-	-	-	-	-	-	-	-	-	-	1	630	2310	-	0.92
640-659	-	-	-	-	-	-	-	-	-	-	-	-	2	650	2535	49	0.92
660-679	4	669	3050	392	1.02	100	-	-	-	-	-	-	4	669	3050	392	1.02
680-699	3	692	3420	85	1.03	100	-	-	-	-	-	-	4	691	3428	71	1.04
700-719	3	710	3697	293	1.03	100	-	-	-	-	-	-	4	709	3733	249	1.05
720-739	4	726	3553	253	0.93	100	1	730	4420	-	1.14	100	6	726	3720	399	0.97
740-759	2	753	4355	21	1.02	100	1	750	4550	-	1.08	100	9	748	4272	176	1.02
760-769	3	767	4270	192	0.95	100	1	770	5460	-	1.20	100	9	767	4601	541	1.02
780-799	2	793	4630	141	0.93	100	2	788	5200	28	1.06	100	6	788	4853	390	0.99
800-819	1	800	5120	-	1.00	100	1	800	4830	-	0.94	100	6	803	5167	395	1.00
820-839	1	820	5880	-	1.07	100	2	830	6120	354	1.07	100	5	828	5956	305	1.05
840-859	1	850	6400	-	1.04	100	1	855	6730	-	1.08	100	6	844	6247	324	1.04
860-879	-	-	-	-	-	-	3	868	7210	173	1.10	100	7	868	6841	434	1.05
880-899	-	-	-	-	-	-	2	890	7240	198	1.03	100	3	887	7077	316	1.01
900-919	1	900	6820	-	0.94	100	2	910	8355	403	1.11	100	5	906	6328	3127	0.85
920-939	-	-	-	-	-	-	2	925	7980	170	1.01	100	3	923	7893	192	1.00
940-959	-	-	-	-	-	-	3	942	8610	151	1.03	100	5	943	8776	318	1.05
980-999	-	-	-	-	-	-	-	-	-	-	-	-	1	990	11250	-	1.16
1000-1019	-	-	-	-	-	-	1	1000	11050	-	1.11	100	3	1004	12497	2343	1.23
1020-1039	-	-	-	-	-	-	1	1030	11640	-	1.07	100	1	1030	11640	-	1.07
TOTAL	25						23						95				
MEAN		742	4110	1043	0.99			872	7214	1893	1.07			792	5488	2471	1.06

Table 11. Biological data by length interval for Arctic cisco, both sexes combined, taken by survey gillnets at the Upper Ramparts of the Mackenzie River, September 1995.

LENGTH INTERVAL (mm)	n	%	LENGTH (mm) mean	WEIGHT (g) mean	WEIGHT (g) SD	K
280-289	1	1	280	580	-	2.64
290-299	2	1	290	255	7	1.05
310-319	1	1	310	690	-	2.32
320-329	2	1	320	370	71	1.13
330-339	2	1	330	390	28	1.09
340-349	9	5	340	531	195	1.35
350-359	15	8	350	588	163	1.37
360-369	29	15	360	554	115	1.19
370-379	42	22	370	555	66	1.10
380-389	37	19	380	641	171	1.17
390-399	22	12	390	677	167	1.14
400-409	12	6	400	737	198	1.15
410-419	7	4	410	779	139	1.13
420-429	6	3	420	808	73	1.09
430-439	1	1	430	960	-	1.21
440-449	2	1	440	860	311	1.01
490-499	1	1	490	550	-	0.47
TOTAL	191					
MEAN			374	614	167	1.18

Table 12. Biological data by age class for broad whitefish taken by survey gillnets at the Upper Ramparts of the Mackenzie River, September 1995.

AGE	MALES							FEMALES							TOTAL					
(y)		Length (mm)		Weight (g)		K	Mat (%)		Length (mm)		Weight (g)		K	Mat (%)		Length (mm)		Weight (g)		K
	n	mean	SD	mean	SD			n	mean	SD	mean	SD			n	mean	SD	mean	SD	
6	-	-	-	-	-	-	-	1	470	-	1620	-	1.56	100	4	505	51	2180	949	1.62
7	4	475	17	1558	118	1.46	100	3	480	17	1770	151	1.60	100	20	483	22	1882	785	1.63
8	8	480	21	1724	360	1.54	100	2	470	28	1740	382	1.66	100	54	494	23	2034	657	1.66
9	3	510	50	2283	740	1.68	100	7	473	14	1711	164	1.62	100	36	503	38	2140	634	1.64
10	3	510	36	1947	247	1.47	100	2	500	14	1800	198	1.44	100	23	507	21	2041	383	1.56
11	3	487	6	1837	111	1.60	100	4	488	19	1925	250	1.65	100	31	511	34	2226	590	1.67
12	4	480	22	1590	154	1.46	100	1	460	-	1550	-	1.59	100	17	515	33	2217	794	1.58
13	3	530	30	2293	508	1.52	100	1	490	-	2200	-	1.87	100	17	520	26	2099	318	1.49
14	1	520	-	2140	-	1.52	100	1	460	-	1830	-	1.88	100	21	530	34	2381	425	1.60
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	492	33	1858	392	1.55
16	1	510	-	1890	-	1.42	100	1	510	-	2110	-	1.59	100	10	529	32	2302	649	1.55
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	540	39	2460	476	1.55
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	550	-	2730	-	1.64
20	-	-	-	-	-	-	-	1	600	-	3830	-	1.77	100	1	600	-	3830	-	1.77
21	1	580	-	3220	-	1.65	100	-	-	-	-	-	-	-	1	580	-	3220	-	1.65
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	600	-	3190	-	1.48
TOTAL	31							24							251					
MEAN		496	33	1894	469	1.53			485	30	1884	467	1.63			508	34	2142	623	1.61
MEAN AGE	10.3							10.2							10.6					

Table 13. Biological data by length interval for broad whitefish taken by survey gillnets at the Upper Ramparts of the Mackenzie River, September 1995.

LENGTH INTERVAL (mm)	MALES						FEMALES						TOTAL				
		Length(mm)	Weight(g)		K	Mat (%)		Length(mm)	Weight(g)		K	Mat (%)		Length(mm)	Weight(g)		K
	n	mean	mean	SD			n	mean	mean	SD			n	mean	mean	SD	
440-449	-	-	-	-	-	-	-	-	-	-	-	-	2	440	1260	28	1.48
450-459	1	450	1660	-	1.82	100	2	450	1470	0	1.61	100	4	450	1503	109	1.65
460-469	5	460	1496	108	1.54	100	5	460	1622	126	1.67	100	19	460	1649	523	1.69
470-479	3	470	1483	32	1.43	100	2	470	1700	113	1.64	100	18	470	1603	166	1.54
480-489	4	480	1778	132	1.61	100	3	480	1803	121	1.63	100	25	480	1727	134	1.56
490-499	4	490	1660	210	1.41	100	8	490	1934	191	1.64	100	36	490	1837	190	1.56
500-509	4	500	1723	51	1.38	100	2	500	2050	99	1.64	100	29	500	1933	189	1.55
510-519	4	510	2183	195	1.65	100	2	510	2025	120	1.53	100	31	510	2232	468	1.68
520-529	1	520	2140	-	1.52	100	-	-	-	-	-	-	23	520	2407	688	1.71
530-539	1	530	2400	-	1.61	100	-	-	-	-	-	-	19	530	2270	276	1.52
540-549	-	-	-	-	-	-	-	-	-	-	-	-	13	540	2608	707	1.66
550-559	1	550	2230	-	1.34	100	-	-	-	-	-	-	8	550	3001	846	1.80
560-569	2	560	2880	198	1.64	100	-	-	-	-	-	-	16	560	2763	340	1.57
570-579	-	-	-	-	-	-	-	-	-	-	-	-	4	570	2763	283	1.49
580-589	1	580	3220	-	1.65	100	-	-	-	-	-	-	6	580	3352	482	1.72
590-599	-	-	-	-	-	-	-	-	-	-	-	-	3	590	3227	169	1.57
600-609	-	-	-	-	-	-	1	600	3830	-	1.77	100	2	600	3510	453	1.63
TOTAL	31						25						258				
MEAN		496	1894	461	1.53			485	1892	459	1.64			508	2139	616	1.61

Table 14. Biological data by age class for inconnu taken by survey gillnets at the Upper Ramparts of the Mackenzie River, September 1995.

AGE	MALES							FEMALES							TOTAL					
(y)	Length (mm)			Weight (g)		K	Mat (%)	Length (mm)			Weight (g)		K	Mat (%)	Length (mm)			Weight (g)		K
	n	mean	SD	mean	SD			n	mean	SD	mean	SD			n	mean	SD	mean	SD	
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	510	-	1440	-	1.09
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	540	-	1330	-	0.84
7	4	603	51	2243	659	1.00	25	-	-	-	-	-	-	-	4	603	51	2243	659	1.00
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	585	92	1880	820	0.91
9	3	683	55	3117	871	0.96	100	1	760	-	4360	-	0.99	100	6	688	60	3220	961	0.96
10	3	667	21	2953	517	0.99	100	2	715	78	3955	1520	1.05	100	7	694	45	3349	845	0.98
11	2	710	28	3090	198	0.86	100	3	783	75	5157	1905	1.04	100	9	736	57	4010	1409	0.98
12	2	735	21	3680	325	0.93	100	3	780	26	4717	790	0.99	100	8	751	32	4136	777	0.97
13	1	680	-	2720	-	0.87	100	2	805	21	4760	651	0.91	100	6	753	59	4002	1009	0.92
14	2	765	7	4015	318	0.90	100	-	-	-	-	-	-	-	5	766	36	4288	544	0.95
15	3	760	20	3993	225	0.91	100	-	-	-	-	-	-	-	5	774	71	4494	1659	0.94
16	3	713	31	3173	458	0.87	100	1	810	-	5850	-	1.10	100	4	738	54	3843	1390	0.93
17	-	-	-	-	-	-	-	1	900	-	8170	-	1.12	100	2	885	21	7490	962	1.08
18	-	-	-	-	-	-	-	2	905	21	7135	544	0.96	100	2	905	21	7135	544	0.96
19	-	-	-	-	-	-	-	2	860	14	7030	537	1.10	100	3	873	25	7063	384	1.06
21	-	-	-	-	-	-	-	1	900	-	7760	-	1.06	100	1	900	-	7760	-	1.06
TOTAL	23							18							66					
MEAN		695	61	3173	736	0.93			813	70	5640	1595	1.02			735	93	4075	1687	0.97
MEAN AGE	11.5							14.0							12.3					

Table 15. Biological data by length interval for inconnu taken by survey gillnets at the Upper Ramparts of the Mackenzie River, September 1995.

LENGTH INTERVAL (mm)	MALES						FEMALES						TOTAL			
		Length (mm)	Weight (g)		K	Mat (%)		Length (mm)	Weight (g)		K	Mat (%)		Length (mm)	Weight (g)		K
	n	mean	mean	SD			n	mean	mean	SD			n	mean	mean	SD	
500-519	-	-	-	-	-	-	-	-	-	-	-	-	1	510	1440	-	1.09
520-539	-	-	-	-	-	-	-	-	-	-	-	-	1	520	1300	-	0.92
540-559	1	550	1740	-	1.05	0	-	-	-	-	-	-	2	545	1535	290	0.95
580-599	1	580	1710	-	0.88	0	-	-	-	-	-	-	1	580	1710	-	0.88
600-619	1	610	2420	-	1.07	0	-	-	-	-	-	-	2	610	2190	325	0.96
620-639	1	620	2120	-	0.89	100	-	-	-	-	-	-	1	620	2120	-	0.89
640-659	1	650	2640	-	0.96	100	-	-	-	-	-	-	2	650	2550	127	0.93
660-679	2	665	2885	304	0.98	100	1	660	2880	-	1.00	100	3	663	2883	215	0.99
680-699	4	685	2968	409	0.92	100	-	-	-	-	-	-	7	684	2971	296	0.93
700-719	2	705	3360	198	0.96	100	-	-	-	-	-	-	8	706	3396	262	0.96
720-739	4	723	3478	205	0.92	100	-	-	-	-	-	-	5	724	3474	178	0.92
740-759	3	743	3673	276	0.89	100	3	743	3980	277	0.97	100	7	743	3806	279	0.93
760-779	4	765	4108	238	0.92	100	2	765	4695	474	1.05	100	9	764	4408	413	0.99
780-799	1	780	4170	-	0.88	100	2	790	4690	552	0.95	100	5	784	4532	372	0.94
800-819	-	-	-	-	-	-	2	805	5555	417	1.06	100	3	807	5423	373	1.03
820-839	-	-	-	-	-	-	1	820	5220	-	0.95	100	1	820	5220	-	0.95
840-859	-	-	-	-	-	-	1	850	6650	-	1.08	100	1	850	6650	-	1.08
860-879	-	-	-	-	-	-	2	870	7375	49	1.12	100	3	870	7187	328	1.09
880-899	-	-	-	-	-	-	1	890	6750	-	0.96	100	2	890	7060	438	1.00
900-919	-	-	-	-	-	-	2	900	7965	290	1.09	100	3	900	7687	524	1.05
920-939	-	-	-	-	-	-	1	920	7520	-	0.97	100	1	920	7520	-	0.97
TOTAL	25						18						68				
MEAN		698	3221	741	0.93			813	5640	1595	1.02			735	4066	1666	0.97

Table 16. Biological data by length interval for northern pike, both sexes combined, taken by survey gillnets at the Ramparts of the Mackenzie River, September 1995.

LENGTH INTERVAL (mm)	n	%	LENGTH (mm) mean	WEIGHT (g) mean	WEIGHT (g) SD	K
380-399	1	5	390	390	-	0.66
480-499	4	18	485	833	156	0.73
500-519	7	32	506	1184	498	0.91
520-539	1	5	520	870	-	0.62
540-559	6	27	547	1047	120	0.64
620-639	1	5	630	1870	-	0.75
660-679	1	5	660	1980	-	0.69
700-719	1	5	700	3210	-	0.94
TOTAL	22					
MEAN			530	1192	624	0.76

Table 17. Biological data by age class for broad whitefish taken by survey gillnets from the Little Chicago area of the Mackenzie River, September 1995.

AGE (y)	MALES n	MALES Length(mm) mean	MALES Length(mm) SD	MALES Weight(g) mean	MALES Weight(g) SD	MALES K	MALES Mat (%)	FEMALES n	FEMALES Length(mm) mean	FEMALES Length(mm) SD	FEMALES Weight(g) mean	FEMALES Weight(g) SD	FEMALES K	FEMALES Mat (%)	TOTAL n	TOTAL Length(mm) mean	TOTAL Length(mm) SD	TOTAL Weight(g) mean	TOTAL Weight(g) SD	TOTAL K
6	1	505	-	1900	-	1.48	100	-	-	-	-	-	-	-	2	490	21	1825	106	1.55
7	3	515	40	2213	680	1.58	100	1	465	-	1590	-	1.58	100	7	499	30	1933	482	1.53
8	7	489	33	1799	491	1.50	100	5	500	35	1974	443	1.56	100	15	495	30	1903	429	1.54
9	3	560	40	2690	635	1.51	100	3	512	28	2147	264	1.60	100	15	508	37	2025	509	1.52
10	4	510	22	1840	247	1.38	100	4	510	33	2240	195	1.70	100	11	513	23	2061	267	1.53
11	1	485	-	1620	-	1.42	100	1	550	-	3080	-	1.85	100	9	504	23	2022	457	1.56
12	1	530	-	2050	-	1.38	100	2	503	32	2290	693	1.77	100	5	529	31	2388	468	1.61
13	3	487	35	1800	622	1.52	100	3	523	31	2087	447	1.46	100	8	520	42	2193	807	1.52
14	1	560	-	2630	-	1.50	100	3	500	30	1953	411	1.55	100	6	514	40	2062	499	1.49
15	1	525	-	2080	-	1.44	100	4	505	45	2058	767	1.54	100	6	517	40	2145	628	1.52
16	2	460	0	1370	127	1.41	100	-	-	-	-	-	-	-	5	486	32	1756	541	1.49
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	520	-	2070	-	1.47
TOTAL	27							26							90					
MEAN		506	38	1966	539	1.48			507	32	2110	471	1.60			507	33	2028	492	1.53
MEAN AGE	10.1							11.2							10.7					

Table 18. Biological data by length interval for broad whitefish taken by survey gillnets from the Little Chicago area of the Mackenzie River, September 1995.

LENGTH INTERVAL (mm)	MALES						FEMALES						TOTAL				
		Length(mm)	Weight(g)		K	Mat (%)		Length(mm)	Weight(g)		K	Mat (%)		Length(mm)	Weight(g)		K
	n	mean	mean	SD			n	mean	mean	SD			n	mean	mean	SD	
440-449	1	440	1260	-	1.48	100	-	-	-	-	-	-	1	440	1260	-	1.48
450-459	1	450	1310	-	1.44	100	1	455	1430	-	1.52	100	3	452	1370	60	1.49
460-469	3	460	1357	93	1.39	100	1	465	1590	-	1.58	100	4	461	1415	139	1.44
470-479	1	475	1520	-	1.42	100	3	472	1653	286	1.57	100	7	472	1579	212	1.50
480-489	3	483	1617	25	1.43	100	4	483	1748	100	1.56	100	17	482	1666	108	1.49
490-499	2	490	1650	85	1.40	100	1	490	1780	-	1.51	100	4	490	1708	83	1.45
500-509	2	503	1865	49	1.47	100	5	500	2128	152	1.70	100	12	501	2007	217	1.60
510-519	3	512	1997	323	1.49	100	3	510	2133	124	1.61	100	12	511	2051	197	1.53
520-529	4	521	2183	220	1.54	100	1	525	2780	-	1.92	100	10	521	2246	242	1.59
530-539	2	530	2350	424	1.58	100	2	530	2475	177	1.66	100	7	531	2440	382	1.63
540-549	1	540	2190	-	1.39	100	1	540	2380	-	1.51	100	2	540	2285	134	1.45
550-559	1	555	2880	-	1.68	100	4	551	2493	494	1.49	100	9	552	2474	377	1.47
560-569	2	560	2580	71	1.47	100	-	-	-	-	-	-	3	560	2687	191	1.53
570-579	-	-	-	-	-	-	1	570	3161	-	1.71	100	1	570	3161	-	1.71
580-589	-	-	-	-	-	-	-	-	-	-	-	-	1	580	3880	-	1.99
600-609	1	600	3390	-	1.57	100	-	-	-	-	-	-	1	600	3390	-	1.57
TOTAL	27						27						94				
MEAN		506	1966	539	1.48			507	2112	462	1.60			507	2030	498	1.53

Table 19. Biological data by age class for broad whitefish, both sexes combined, taken by survey gillnets upstream from the Little Chicago area of the Mackenzie River, September 1995.

AGE (y)	n	%	LENGTH (mm) mean	LENGTH (mm) SD	WEIGHT (g) mean	WEIGHT (g) SD	K
6	2	5	500	42	1960	495	1.55
7	3	7	498	8	1990	173	1.61
8	11	26	511	16	2045	244	1.53
9	4	10	501	22	1920	190	1.52
10	7	17	543	39	2354	761	1.47
11	1	2	535	-	2010	-	1.31
12	3	7	493	23	1777	243	1.48
13	3	7	517	6	2927	1383	2.11
14	4	10	528	24	2873	1338	1.93
15	2	5	530	42	2170	99	1.48
16	1	2	510	-	1900	-	1.43
20	1	2	490	-	1580	-	1.34
TOTAL	42						
MEAN			516	27	2190	685	1.59
MEAN AGE	10.4						

Table 20. Biological data by length interval for broad whitefish, both sexes combined, taken by survey gillnets upstream from the Little Chicago area of the Mackenzie River, September 1995.

LENGTH INTERVAL (mm)	n	%	LENGTH (mm) mean	WEIGHT (g) mean	WEIGHT (g) SD	K
470-479	2	5	473	1545	92	1.47
480-489	4	9	480	1648	141	1.49
490-499	5	11	492	1820	195	1.53
500-509	8	18	503	2016	190	1.59
510-519	7	16	510	1911	162	1.44
520-529	5	11	520	2624	1062	1.87
530-539	5	11	531	2774	1124	1.86
540-549	3	7	542	2450	242	1.54
560-569	2	5	560	2590	495	1.47
570-579	2	5	573	3085	785	1.65
590-599	1	2	590	1630	-	0.79
TOTAL	44					
MEAN			515	2173	677	1.58

Table 21. Statistical comparisons of otolith and fin age and laboratory and field weight and length for broad whitefish and inconnu captured from the Mackenzie River, 1995.

SPECIES	REGRESSION	UNITS OF MEASUREMENT	NUMBER OF OBSERVATIONS	SLOPE (Standard Error)	Y-INTERCEPT (Standard Error)	REGRESSION EQUATION [y = slope x +y-intercept]	R-SQUARED
broad whitefish	fin age (y) on otolith age (x)	years	131	0.683 (0.030)	2.63 (0.38)	y = 0.683x + 2.63	0.801
	lab length (y) on field length (x)	round weight in grams	131	0.935 (0.026)	13.66 (13.41)	y = 0.935x + 13.66	0.907
	lab weight (y) on field weight (x)	fork length in mm	131	0.996 (0.006)	-11.26 (13.46)	y = 0.996x - 11.26	0.995
inconnu	fin age (y) on otolith age (x)	years	95	0.847 (0.022)	1.46 (0.32)	y = 0.847x + 1.46	0.940
	lab length (y) on field length (x)	round weight in grams	95	1.010 (0.008)	-23.31 (6.34)	y = 1.010x - 23.31	0.994
	lab weight (y) on field weight (x)	fork length in mm	95	0.991 (0.002)	2.62 (11.75)	y = 0.991x + 2.62	0.999

APPENDIX 1. Description of the boundaries of Sahtu Dene and Metis Special Harvesting Areas (fish) 1 and 2, as described in Appendix E of the Sahtu Dene and Metis Comprehensive Land Claim Agreement.

SPECIAL HARVESTING AREA 1

In the Northwest Territories;
in the District of Mackenzie;

All that portion of Mackenzie River more particularly described as follows, all topographic features hereinafter referred to being according to:

edition 2 of the Bryan Island NTS map sheet, number 106 O/1, produced at a scale of 1:50,000;

Commencing at the point of intersection of the west bank of Mackenzie River with latitude 67°15'00"N at approximate longitude 130°22'57"W;

thence east in a straight line to the intersection of the said latitude with the east bank of Mackenzie River at approximate longitude 130°18'36"W;

thence southeasterly and southerly along the bank of said river to its intersection with latitude 67°00'00"N at approximate longitude 130°11'55"W;

thence west in a straight line to the intersection of said latitude with the west bank of Mackenzie River at approximate longitude 130°16'10"W;

thence northerly along the bank of said river to the point of commencement.

SPECIAL HARVESTING AREA 2

In the Northwest Territories;
in the District of Mackenzie;

All that portion of Mackenzie River more particularly described as follows, all topographic features hereinafter referred to being according to:

edition 1 of the Tsintu River NTS map sheet, number 106 I/2, produced at a scale of 1:50,000;

edition 1 of the unnamed NTS map sheet, number 106 I/3, produced at a scale of 1:50,000;

Commencing at the point of intersection of the northwest bank of Mackenzie River with latitude 66°10'30"N at approximate longitude 129°03'15"W;

thence northeasterly along the bank of said river to its intersection with longitude 128°50'00"W at approximate latitude 66°13'37"N;

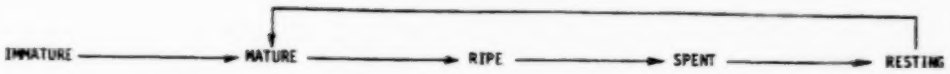
thence south in a straight line to the intersection of said longitude with the southeast bank of Mackenzie River at approximate latitude 66°12'50"N;

thence southeasterly along the bank of said river to its intersection with latitude 66°10'30"N at approximate longitude 128°55'24"W;

thence west in a straight line to the point of commencement.

APPENDIX 2. Description of the relative stages of maturity used for northern fish (from Falk et al. 1982).

MATURITY FLOW CHART



FISH MATURITY CODE

Maturity Stage		Female		Male
Immature (virgin)	1	-Ovaries granular in texture -hard and triangular in shape -up to full length of body cavity -membrane firm -eggs distinguishable	6	-Testes long and thin -tubular and scalloped shape -up to full body length -putty like firmness
Mature	2	-Current year spawner -ovary fills body cavity -eggs near full size but not loose -not expelled by pressure	7	-Current year spawner -testes large and lobate -white to purplish color -centers may be fluid -milt not expelled by pressure
Ripe	3	-Ovaries greatly extended & fill body cavity -eggs full size and transparent -expelled by slight pressure	8	-Testes full size -white and lobate -milt expelled by slight pressure
Spent	4	-Spawning complete -ovaries ruptured and flaccid -seed eggs visible -some retained eggs in body cavity	9	-Spawning complete -testes flaccid with some milt -blood vessels obvious -testes violet-pink in color
Resting	5	-Ovary 40-50% of body cavity -membrane thin, loose, & semi-transparent -healed from spawning -seed eggs apparent with few atretic eggs -some eggs may be retained in body cavity	10	-Testes tubular, less lobate -healed from spawning -no fluid in center -usually full length -mottled and purplish in color
Unknown (Virgin)	0	-cannot be sexed -gonads long or short & thin -transparent or translucent		
Unknown (non-virgin)	11	-resting fish -has spawned but gonads regenerated -sexing not possible		

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length		Round weight		Age		Sex	Tissue metal concentrations (ug/g wet weight)								
(ddmmyy)	Field	Genetics	Tissue	(mm)		(g)		(y)		Mat	Muscle			Kidney			Liver		
	collection	lab	metals	Field	Lab	Field	Lab	Fin	Oto		As	Hg	Se	As	Hg	Se	As	Hg	Se
UPPER RAMPARTS OF THE MACKENZIE RIVER, JULY 1995																			
Broad whitefish, 89mm mesh																			
210795	3033	41212	9503133	570	544	3140	3119	15	17	7	0.06	0.060	0.34	---	0.182	---	0.12	0.101	1.19
230795	3048	41204	9503125	520	508	1950	1954	19	20	7	< 05	0.078	0.13	---	0.104	---	---	0.126	---
240795	3050	41184	9503105	430	419	1250	1297	8	7	7	< 05	0.035	0.28	---	0.177	---	0.09	0.173	1.58
Broad whitefish, 114 mm mesh																			
180795	4001	41198	9503119	530		2270	2255	14	15	7	< 05	0.074	0.15	---	0.155	---	0.06	0.133	1.07
190795	4012	41200	9503121	520	488	2400	2441	8	8	7	0.08	0.038	0.21	---	0.147	---	0.07	0.149	0.89
220795	4025	41202	9503123	525	516	2280	2268	11	12	2	< 05	0.046	0.12	---	0.074	---	0.11	0.090	1.11
220795	4026	41206	9503127	600	592	3410	3384	22	24	7	< 05	0.062	0.29	---	0.051	---	0.06	0.092	0.91
250795	4032	41180	9503101	570	558	2450	2437	7	9	7	< 05	0.072	0.63	---	0.390	---	0.09	0.197	1.90
260795	4036	41195	9503116	470	468	1560	1633	8	9	2	< 05	0.051	0.20	---	0.093	---	0.07	0.071	1.00
Broad whitefish, 140 mm mesh																			
180795	5001	41194	9503115	525	496	2480	2457	14	18	2	< 05	0.067	0.08	---	0.167	---	0.08	0.148	0.76
190795	5008	41187	9503108	490	474	2240	2227	8	9	2	< 05	0.033	0.28	---	0.123	---	0.13	0.081	1.06
190795	5010			445		1370		8											
190795	5019	41193	9503114	500	488	1980	1960	16	17	2	0.08	0.053	0.17	---	0.102	---	0.33	0.148	0.84
200795	5027	41192	9503113	550	520	2900	2871	12	22	7	0.05	0.077	0.18	---	0.123	---	0.07	0.116	0.70
200795	5028	41197	9503118	560	530	3550	3499	17	21	2	< 05	0.072	0.14	---	0.173	---	0.09	0.108	1.04
200795	5029	41191	9503112	560	540	2900	2898	9	9	7	0.06	0.050	0.32	---	0.094	---	0.10	0.126	1.17
200795	5030	41211	9503132	540	525	1980	1963	15	16	7	0.06	0.039	0.25	---	0.077	---	0.06	0.106	1.36
210795	5040	41208	9503129	560		2440	2437	15	17	7	< 05	0.034	0.27	---	---	---	0.22	0.123	1.86
220795	5044	41203	9503124	430	408	1150	1134	6	4	7	< 05	0.034	0.23	---	0.057	---	0.10	0.121	1.49
220795	5045	41199	9503120	565	562	3050	3059	13	15	7	< 05	0.101	0.15	---	0.173	---	0.05	0.113	0.77
220795	5046	41186	9503107	550	525	3160	3133	9	8	7	< 05	0.027	0.34	---	0.080	---	0.06	0.055	0.95
220795	5047	41209	9503130	440	430	1300	1315	4	4	7	< 05	0.129	0.24	---	0.278	---	0.10	0.384	1.14
230795	5052	41210	9503131	500	482	1560	1559	10	10	7	0.06	0.046	0.18	---	0.071	---	0.08	0.100	1.12
230795	5053	41185	9503106	520		2380	2367	16	19	7	< 05	0.071	0.16	---	0.077	---	0.10	0.135	0.81
240795	5054	41181	9503102	600	579	3980	3960	14	16	7	< 05	0.024	0.35	---	0.053	---	0.06	0.099	1.05
240795	5055	41188	9503109	560	542	3250	3247	13	16	2	< 05	0.084	0.11	---	0.207	---	0.08	0.185	0.80
240795	5056	41182	9503103	460	441	1290	1266	8		7	< 05	0.049	0.30	---	0.063	---	0.13	0.104	1.85
240795	5057	41183	9503104	570	550	2960	2944	18	19	7	0.11	0.021	0.62	---	0.201	---	0.16	0.195	2.03
240795	5058	41207	9503128	545	521	3020	3018	9	9	2	< 05	0.024	0.51	---	0.181	---	0.09	0.060	1.50
250795	5064	41189	9503110	580	558	3600	3601	9	9	7	< 05	0.027	0.39	---	0.163	---	0.08	0.146	1.40
260795	5065	41205	9503126	545	520	2940	2936	8	9	7	< 05	0.019	0.49	---	0.179	---	0.06	0.102	1.76
260795	5067	41201	9503122	520	500	1660	1697	14	17	7	0.06	0.053	0.20	---	0.100	---	0.09	0.096	1.59
260795	5068	41196	9503117	515	502	1980	1991	12	12	7	< 05	0.059	0.54	---	0.175	---	0.08	0.118	1.34
Burbot, 114 mm mesh																			
220795	4027			565		1250													

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length (mm)		Round weight (g)		Age (y)		Sex	Tissue metal concentrations (ug/g wet weight)								
											Muscle			Kidney			Liver		
(ddmmyy)	Field collection	Genetics lab	Tissue metals	Field	Lab	Field	Lab	Fin	Oto	Mat	As	Hg	Se	As	Hg	Se	As	Hg	Se
Cisco sp. 89 mm mesh																			
210795	3037			420		890													
210795	3038			415		880													
210795	3039			380		610													
220795	3047			390		680													
230795	3049			420		870													
250795	3055			380		730													
Inconnu, 89 mm mesh																			
180795	3003			945		8750	8541	18	18	2									
180795	3004			1030		11640	11543	20	21	2									
180795	3005			730	702	3830	3801	12	15	7									
190795	3006			800	795	4830	4788	13	17	2									
190795	3007			650		2570		11											
190795	3008			900		6820	6804	18	19	7									
190795	3009			850	839	6400	6400	17	18	7									
190795	3010			790	772	4730	4692	15	16	7									
190795	3011			760	748	4400	4381	13	15	7									
190795	3012			400	392	640	630	6	3										
190795	3015			770	747	5460*	5446	13	13	2									
200795	3018			670	651	2640	2625	10	10	7									
200795	3019			675	664	3380*	3361	11	11	7									
200795	3020			755	755	4340	4279	17	17	7									
200795	3021			790	782	5180	5085	12	12	2									
200795	3022			750	745	4550	4526	12	12	2									
200795	3023			670	656	3390*	3347	11	12	7									
200795	3024			715	710	3890	3860	12	12	7									
200795	3025			690	675	3500	3483	7	7	7									
200795	3026			720	709	3440	3385	14	16	7									
200795	3029			840		5890		16											
200795	3030			740		3890		13											
200795	3031			705		3840		13											
200795	3032			485		1000		5											
210795	3034			750		4240		14											
210795	3035			750		4310		15											
210795	3036			840		6250		15											
210795	3042			740		4230		11											
210795	3043			830		6110		15											
210795	3044			750		4320		13											
220795	3045			775		4940		16											
240795	3054			590		8500		19											
250795	3058			870		6290		14											
Inconnu, 114 mm mesh																			

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length (mm)		Round weight (g)		Age (y)		Sex	Tissue metal concentrations (ug/g wet weight)								
(ddmmyy)	Field collection	Genetics lab	Tissue metals	Field	Lab	Field	Lab	Fin	Oto	Mat	Muscle			Kidney			Liver		
											As	Hg	Se	As	Hg	Se	As	Hg	Se
180795	4002			830		6370	6326	12	15	2									
180795	4003			1000	995	11050	10958	23	25	2									
180795	4007			930	915	8100	8060	18	19	2									
180795	4008			940	925	8450	8125	18	19	2									
180795	4009			730	706	4420	4404	10	11	2									
180795	4010			920	902	7860	7817	19	20	2									
190795	4011			870	855	7360	7316	12	13	2									
190795	4014			765	753	4050	4098	15	15	7									
190795	4015			910	890	8070	8006	18	16	2									
190795	4016			890		7380	7308	16	22	2									
200795	4017			800		4980													
200795	4018			765		5280		10											
210795	4023			990		11250		20											
220795	4028			760		4030		16											
230795	4029			840		6330		14											
240795	4030			780		5160		15											
250795	4033			515		3430		10											
260795	4034			945		8750													
260795	4037			800		4790		17											
Inconnu, 140 mm mesh																			
180795	5002			860		7020	6963	16	17	2									
180795	5003			695	670	3330	3279	10	10	7									
180795	5004			720	700	3260	3241	12	13	7									
180795	5005			775	762	4360	4320	12	13	7									
180795	5006			660	650	2790	2786	9	9	7									
180795	5007			820	814	5880	5865	18	19	7									
190795	5009			830	815	5870	5825	17	19	2									
190795	5012			700	695	3360	3307	14	14	7									
190795	5013			940	931	8630	8525	17	19	2									
190795	5014			750	730	4370	4317	12	12	7									
190795	5015			910	902	8640	8389	20	20	2									
190795	5016			785	757	5220	5154	15	15	2									
190795	5017			855	822	6730	6628	16	17	2									
190795	5018			735	722	3680	3676	14	15	7									
190795	5020			875	868	7250	7218	22	22	2									
190795	5021			890	870	7100	7012	19	19	2									
190795	5022			795	768	4530	4707	15	17	7									
190795	5023			800	777	5120	5078	17	17	7									
190795	5024			690	678	3430	3369	11	11	7									
190795	5025			715	695	3840	3820	12	13	7									
200795	5026			760		4090		16											
200795	5031			775		4800		15											
200795	5032			720		3690		13											
210795	5033			1003		11240		24											
210795	5034			910		880		17											
210795	5035			840		5880		16											

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length (mm)		Round weight (g)		Age (y)		Sex	Mat	Tissue metal concentrations (ug/g wet weight)								
												Muscle			Kidney			Liver		
(ddmmyy)	Field collection	Genetics lab	Tissue metals	Field	Lab	Field	Lab	Fin	Oto			As	Hg	Se	As	Hg	Se	As	Hg	Se
210795	5036			880		6750		18												
210795	5037			1010		15200		21												
210795	5038			830		5550														
210795	5039			805		5780		16												
210795	5041			870		6540		23												
220795	5042			690		3450		10												
210795	5043			945		9300		20												
210795	5048			520		1300		5												
210795	5049			870		7060		20												
210795	5050			920		7720		18												
220795	5051			750		4200		9												
250795	5059			785		4300		15												
250795	5060			815		5500		17												
250795	5061			900		7230		20												
260795	5062			630		2310		13												
260795	5063			650		2500		12												
260795	5064			860		6370		16												
Lake chub, 114 mm mesh																				
200795	4019			180		60		7												
Lake whitefish, 89 mm mesh																				
200795	3027			385		820		8												
220795	3046			410		1030		9												
240795	3051			400		910		7												
240795	3052			430		1080		9												
240795	3053			395		890		8												
Lake whitefish, 89 mm mesh																				
180795	4004			350		650		9												
180795	4005			400		890		8												
190795	4013			390		650		11												
200795	4020			385		760		8												
200795	4021			425		1180		15												
210795	4022			385		790		7												
210795	4024			395		900		9												
260795	4035			380		700		8												
Longnose sucker, 89 mm mesh																				
250795	3056			420		830		11												
250795	3057			430		950		10												
Longnose sucker, 114 mm mesh																				

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length		Round weight		Age		Sex	Tissue metal concentrations (ug/g wet weight)								
(ddmmyy)	Field	Genetics	Tissue	(mm)		(g)		(y)		Mat	Muscle			Kidney			Liver		
	collection	lab	metals	Field	Lab	Field	Lab	Fin	Oto		As	Hg	Se	As	Hg	Se	As	Hg	Se
180795	4006			440		1130		14											
240795	4031			430		1000		10											
Northern pike, 89 mm mesh																			
180795	3001			550		1370													
180795	3002			450		730													
190795	3013			510		880													
190795	3014			480		700													
190795	3016			590		163													
190795	3017			540		930													
200795	3028			505		880													
210795	3040			530		970													
210795	3041			500		810													
UPPER RAMPARTS OF THE MACKENZIE RIVER, SEPTEMBER 1995																			
Arctic cisco, 89 mm mesh																			
060995	3001			370		530													
060995	3002			380		570													
060995	3003			370		500													
060995	3004			380		540													
060995	3005			360		580													
060995	3006			390		620													
060995	3011			410		780													
060995	3012			390		630													
060995	3013			340		410													
060995	3014			360		420													
060995	3018			400		660													
060995	3019			380		550													
060995	3020			380		520													
070995	3024			390		590													
070995	3025			390		600													
070995	3026			350		520													
070995	3027			390		570													
070995	3028			380		570													
070995	3029			390		680													
070995	3030			350		520													
070995	3031			350		480													
070995	3032			340		510													
070995	3033			370		560													
070995	3034			380		640													
070995	3035			390		680													
070995	3042			390		1150													
070995	3043			390		1070													
070995	3044			410		1050													

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length (mm)		Round weight (g)		Age (y)		Sex	Tissue metal concentrations (ug/g wet weight)								
											Muscle			Kidney			Liver		
(ddmmyy)	Field collection	Genetics lab	Tissue metals	Field	Lab	Field	Lab	Fin	Oto	Mat	As	Hg	Se	As	Hg	Se	As	Hg	Se
070995	3045			310		690													
070995	3046			340		900													
080995	3048			410		860													
080995	3049			380		580													
080995	3050			350		470													
080995	3051			390		680													
080995	3052			370		500													
080995	3053			390		550													
080995	3054			380		560													
080995	3055			390		610													
080995	3056			370		520													
080995	3057			330		410													
080995	3058			380		540													
080995	3059			360		590													
080995	3060			350		610													
080995	3063			380		920													
080995	3064			360		910													
080995	3065			350		880													
080995	3066			380		930													
080995	3067			340		820													
080995	3068			390		980													
080995	3069			350		930													
080995	3070			360		960													
080995	3071			350		870													
080995	3072			370		900													
080995	3073			380		940													
090995	3078			370		540													
090995	3079			380		540													
090995	3080			390		590													
090995	3081			280		580													
090995	3082			340		470													
090995	3083			370		600													
090995	3084			370		570													
090995	3085			290		250													
090995	3086			320		420													
090995	3087			370		500													
090995	3088			430		960													
090995	3089			340		420													
090995	3090			390		590													
090995	3091			360		480													
090995	3092			380		690													
090995	3093			350		510													
090995	3094			360		550													
090995	3099			360		550													
090995	30100			350		470													
090995	30101			360		460													
090995	30102			370		600													
090995	30103			340		500													

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length (mm)		Round weight (g)		Age (y)		Sex	Tissue metal concentrations (ug/g wet weight)								
											Muscle			Kidney			Liver		
(ddmmyy)	Field collection	Genetics lab	Tissue metals	Field	Lab	Field	Lab	Fin	Oto	Mat	As	Hg	Se	As	Hg	Se	As	Hg	Se
090995	30104			380		550													
090995	30107			360		520													
090995	30108			380		520													
090995	30109			420		680													
090995	30110			360		510													
090995	30111			390		530													
090995	30114			350		540													
100995	30115			370		510													
100995	30116			390		650													
100995	30117			380		680													
100995	30118			380		590													
100995	30119			370		590													
100995	30120			360		600													
100995	30121			390		630													
100995	30122			370		560													
100995	30123			360		460													
100995	30124			400		640													
100995	30125			370		590													
100995	30126			360		520													
100995	30127			360		540													
100995	30128			370		510													
100995	30129			370		530													
100995	30130			410		700													
100995	30131			370		520													
100995	30132			380		690													
100995	30133			370		610													
100995	30134			380		680													
100995	30137			420		880													
100995	30138			420		880													
100995	30139			360		510													
100995	30141			380		550													
100995	30152			370		570													
100995	30153			380		630													
100995	30154			360		570													
110995	30155			400		640													
110995	30156			360		580													
110995	30157			350		470													
110995	30158			370		550													
110995	30159			360		480													
110995	30160			360		500													
110995	30161			400		640													
110995	30162			390		570													
110995	30163			380		570													
110995	30164			370		620													
110995	30165			380		590													
110995	30166			400		590													
110995	30167			370		590													
110995	30168			370		510													

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length (mm)		Round weight (g)		Age (y)		Sex	Tissue metal concentrations (ug/g wet weight)								
	Field	Genetics	Tissue								Muscle			Kidney			Liver		
(ddmmyy)	collection	lab	metals	Field	Lab	Field	Lab	Fin	Oto	Mat	As	Hg	Se	As	Hg	Se	As	Hg	Se
110995	30169			380		660													
110995	30170			370		570													
110995	30171			400		750													
110995	30172			400		750													
110995	30177			370		510													
120995	30182			380		560													
120995	30183			370		580													
120995	30184			370		560													
120995	30185			380		510													
120995	30186			350		530													
120995	30187			370		580													
120995	30188			410		660													
120995	30189			360		570													
120995	30190			380		540													
120995	30191			360		530													
120995	30192			400		630													
120995	30193			380		540													
120995	30194			370		540													
120995	30195			360		480													
120995	30196			370		560													
120995	30197			330		370													
120995	30198			360		510													
120995	30201			380		550													
120995	30207			370		500													
120995	30208			360		530													
120995	30209			360		550													
120995	30210			370		510													
130995	30213			400		710													
130995	30214			370		600													
130995	30215			380		530													
130995	30216			370		500													
130995	30217			370		520													
130995	30218			420		810													
130995	30219			370		520													
130995	30220			320		320													
130995	30221			420		800													
130995	30222			370		540													
130995	30223			420		800													
130995	30233			410		740													
140995	30235			410		660													
140995	30236			360		590													
140995	30237			490		550													
140995	30238			360		480													
140995	30239			370		490													
140995	30240			380		540													
140995	30241			390		560													
140995	30243			440		640													
140995	30244			370		510													

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length (mm)		Round weight (g)		Age (y)		Sex	Tissue metal concentrations (ug/g wet weight)								
											Muscle			Kidney			Liver		
(ddmmyy)	Field collection	Genetics lab	Tissue metals	Field	Lab	Field	Lab	Fin	Oto	Mat	As	Hg	Se	As	Hg	Se	As	Hg	Se
140995	30245			360		550													
140995	30246			380		580													
140995	30247			400		730													
140995	30248			350		470													
140995	30249			340		410													
140995	30250			390		650													
140995	30251			370		610													
140995	30252			380		540													
140995	30253			370		530													
140995	30255			400		1340													
140995	30256			380		1160													
140995	30257			380		1200													
Arctic cisco, 114 mm mesh																			
060995	4008			400		760													
070995	4030			380		680													
070995	4031			390		720													
080995	4038			290		260													
100995	4072			440		1080													
Arctic cisco, 140 mm mesh																			
070995	5015			350		550													
130995	50157			340		340													
Broad whitefish, 89 mm mesh																			
060995	3010	41251	9503172	550	590	2230	2308	10	11	7	0.09	0.049	0.23	---	0.064	---	<.05	0.080	0.76
070995	3039	41252	9503173	490	463	2010	2002	8	8	2	0.09	0.224	0.24	---	0.175	---	<.05	0.181	1.27
070995	3040	41213	9503134	480	477	1660	1641	8	8	7	0.06	0.035	0.15	---	0.041	---	0.10	0.050	0.61
070995	3047	41245	9503166	490	460	2100	1679		13	2	0.08	0.051	0.26	---	0.088	---	<.05	0.070	1.09
080995	3061	41246	9503167	490	462	1800	1798	9	9	2	0.06	0.054	0.29	---	0.090	---	<.05	0.084	1.14
080995	3074	41239	9503160	450	436	1660	1270	12	13	7	<.05	0.036	0.12	---	0.109	---	0.06	0.101	1.24
080995	3075	41235	9503156	510	471	2270	1871	8	9	7	<.05	0.059	0.25	---	0.064	---	0.07	0.081	1.07
090995	3096	41225	9503146	500	488	1710	1696	7	8	7	0.12	0.053	0.25	---	0.076	---	0.09	0.083	1.04
090995	3097	41237	9503158	470	461	1470	1456	7	7	7	<.05	0.034	0.40	---	0.042	---	0.05	0.085	1.54
090995	30105			530		1910		12											
090995	30113			480		1710		6											
100995	30135			510		1830		11											
100995	30136			490		1680		15											
100995	30140			510		2160		13											
100995	30142			480		1880		8											
100995	30143			510		2180		8											
100995	30144			520		2200		8											
100995	30145			490		1620		12											
100995	30151			480		1510		8											
110995	30175			490		2130		9											

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length (mm)		Round weight (g)		Age (y)		Sex	Tissue metal concentrations (ug/g wet weight)								
(ddmmyy)	Field collection	Genetics lab	Tissue metals	Field	Lab	Field	Lab	Fin	Oto	Mat	Muscle			Kidney			Liver		
											As	Hg	Se	As	Hg	Se	As	Hg	Se
110995	30176			460		1360		8											
110995	30180			500		1930		8											
120995	30199			470		1550		10											
120995	30200			510		2390		13											
120995	30202			490		1630		13											
120995	30203			470		1570		8											
120995	30204			530		2280		12											
120995	30205			500		1950		11											
120995	30206			500		1890													
130995	30225			530		2210		9											
130995	30226			530		2430		9											
130995	30227			490		1840		7											
130995	30228			560		2040		14											
130995	30229			530		1900		13											
130995	30231			490		2110		7											
130995	30232			530		2370		8											
140995	30234			540		1180		16											
Broad whitefish, 114 mm mesh																			
060995	4001	41256	9503177	490	477	1720	1718	11	11	7	0.08	0.053	0.16	---	0.086	---	< 05	0.147	1.32
060995	4002	41216	9503137	500	486	2120	2117	11	11	2	0.07	0.069	0.12	---	0.168	---	0.12	0.091	0.76
060995	4003	41267	9503188	490	467	1710	1719	8	8	7	0.06	0.037	0.39	---	0.067	---	< 05	0.344	1.14
060995	4004	41220	9503141	470	457	1520	1511	8	8	7	0.08	0.051	0.16	---	0.091	---	0.08	0.117	1.32
060995	4005	41223	9503144	460	452	1650	1651	7	7	2	0.06	0.072	0.19	---	0.118	---	0.12	0.091	0.98
060995	4011			510		2340		16											
060995	4014	41265	9503186	500	477	1740	1727	13	14	7	0.08	0.040	0.28	---	0.118	---	< 05	0.071	1.09
060995	4015	41264	9503185	530	512	2490	2479	12	12	7	< 05	0.035	0.16	---	0.069	---	< 05	0.048	0.92
060995	4016	41262	9503183	470		1620	1620	6	9	2	0.06	0.055	0.13	---	0.093	---	< 05	0.092	0.75
060995	4017			540		2720		10											
060995	4018	41248	9503169	480	473	1680	1658	12	11	7	0.10	0.044	0.15	---	0.087	---	0.05	0.080	0.98
060995	4019	41260	9503181	460	440	1390	1387	8	8	7	< 05	0.033	0.23	---	0.044	---	< 05	0.044	1.09
060995	4020			510		2230		8											
070995	4022	41241	9503162	510	497	1890	1898	16	17	7	0.09	0.039	0.32	---	0.074	---	< 05	0.081	1.48
070995	4023	41243	9503164	520	510	2140	2129	14	18	7	0.06	0.058	0.14	---	0.093	---	< 05	0.104	0.80
070995	4024	41238	9503159	460	452	1830	1821	14	16	2	< 05	0.072	0.18	---	0.106	---	< 05	0.077	0.87
070995	4025	41247	9503168	490		1850	1850	11	15	7	0.09	0.033	0.33	---	0.060	---	< 05	0.044	1.29
070995	4026	41261	9503182	560	570	3020	2999	9	12	7	0.07	0.032	0.24	---	0.253	---	< 05	0.134	1.15
070995	4027	41255	9503176	490	476	2200	1987	13	15	2	0.09	0.054	0.14	---	0.147	---	< 05	0.090	0.94
070995	4028			530		2700		8											
070995	4033	41263	9503184	480	460	1710	1700	9	9	2	< 05	0.063	0.22	---	0.056	---	< 05	0.061	1.11
070995	4034	41240	9503161	490	468	1940	1923	7	8	2	0.14	0.101	0.28	---	0.164	---	< 05	0.107	1.21
070995	4035	41258	9503179	490	455	1660	1646	10	10	2	0.06	0.039	0.39	---	0.064	---	0.08	0.056	1.47
070995	4036	41233	9503154	460	460	1590	1576	8	8	7	0.08	0.051	0.19	---	0.054	---	< 05	0.095	0.93
070995	4037	41249	9503170	480	458	1940	1530	9	9	2	0.09	0.057	0.14	---	0.121	---	< 05	0.080	0.84
080995	4039	41242	9503163	480	465	1760	1737	9	9	2	0.06	0.054	0.29	---	0.103	---	< 05	0.038	1.12
080995	4040	41253	9503174	460	435	1550	1546	12	12	2	0.09	0.072	0.42	---	0.085	---	< 05	0.082	1.38
080995	4041	41244	9503165	460	450	1520	1512	9	10	2	0.06	0.079	0.19	---	0.063	---	< 05	0.102	0.83

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length (mm)		Round weight (g)		Age (y)		Sex	Tissue metal concentrations (ug/g wet weight)								
(ddmmyy)	Field collection	Genetics lab	Tissue metals	Field	Lab	Field	Lab	Fin	Oto	Mat	Muscle			Kidney			Liver		
											As	Hg	Se	As	Hg	Se	As	Hg	Se
080995	4044			470		2050		8											
080995	4045			480		1940		11											
080995	4046			590		3110		16											
080995	4048	41215	9503136	450	437	1470	1484	8	8	2	0.07	0.030	0.05	---	0.078	---	< 05 redigest		0.44
090995	4051			570		3160		11											
090995	4052	41232	9503153	510	507	2110	2090	16	16	2	0.09	0.089	0.12	---	0.235	---	0.14	0.101	0.79
090995	4053	41234	9503155	460	452	1590	1580	7	7	7	< 05	0.082	0.27	---	0.112	---	< 05	0.157	1.47
090995	4060	41218	9503139	510	500	1940	1924	10	11	2	0.05	0.051	0.28	---	0.125	---	0.08	0.069	0.92
100995	4061			530		2160		9											
100995	4062			550		2760		14											
100995	4063			520		2300		10											
100995	4064			500		1920		10											
100995	4066			590		3420		9											
100995	4067			470		1300		7											
100995	4068			490		1740		11											
100995	4069			470		1670		8											
100995	4070			470		1520		11											
100995	4071			500		1940		8											
100995	4073			540		2500		14											
100995	4074			460		1490		15											
100995	4075			510		2390		11											
100995	4076			480		1900		10											
100995	4077			490		1810		8											
100995	4078			490		1610		10											
100995	4080			480		1500		8											
110995	4081			530		2420		10											
110995	4082			490		1730		8											
110995	4083			520		2250		14											
110995	4084			510		2070		9											
110995	4085			500		1940		11											
110995	4086			520		2030		14											
120995	4088			520		2160		10											
120995	4089			480		1780													
120995	4090			580		3560		11											
120995	4091			520		2260		13											
120995	4092			490		1880		9											
120995	4093			570		2490		17											
120995	4094			500		1900		13											
120995	4098			520		2430		8											
120995	4099			470		1710		7											
130995	40100			520		2270		14											
130995	40101			470		1470		9											
130995	40102			560		2400		13											
130995	40103			540		2220		8											
130995	40104			550		2840		12											
130995	40105			450		1410		14											

Broad whitefish, 140 mm mesh

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length (mm)		Round weight (g)		Age (y)		Sex	Tissue metal concentrations (ug/g wet weight)								
											Muscle			Kidney			Liver		
(ddmmyy)	Field collection	Genetics lab	Tissue metals	Field	Lab	Field	Lab	Fin	Oto	Mat	As	Hg	Se	As	Hg	Se	As	Hg	Se
060995	5002	41257	9503178	480	448	1830	1835	10	11	7	0.07	0.032	0.32	---	0.037	---	< 05	0.036	1.46
060995	5003	41224	9503145	510	494	2280	2264	8	8	7	0.07	0.063	0.12	---	0.067	---	0.11	0.171	1.26
060995	5004	41214	9503135	530	501	2400	2374	13	14	7	0.06	0.043	0.17	---	0.045	---	0.11	0.094	1.00
060995	5005	41222	9503143	600	551	3830	3822	20	24	2	0.07	0.102	0.14	---	0.189	---	0.16	0.144	0.76
060995	5006	41254	9503175	560	528	2740	2744	13	12	7	0.10	0.045	0.18	---	0.125	---	< 05	0.077	1.05
060995	5007	41217	9503138	470	446	1460	1454	7	7	7	0.06	0.063	0.36	---	0.110	---	0.09	0.088	1.31
060995	5009	41268	9503189	500	481	1780	1767	10	9	7	0.06	0.040	0.15	---	0.044	---	0.08	0.098	0.96
070995	5010			530		2200		13											
070995	5011			550		2800		12											
070995	5012	41266	9503187	490	470	1720	1719	7	8	2	0.08	0.184	0.24	---	0.256	---	< 05	0.064	1.74
070995	5013	41259	9503180	460		1540	1530	9	11	7	0.06	0.067	0.33	---	0.096	---	0.06	0.127	1.40
070995	5014	41250	9503171	450		1470	1470	9	16	2	0.09	0.048	0.16	---	0.062	---	< 05	0.072	1.16
070995	5016	41219	9503140	500	485	1660	1613	12	11	7	< 05	0.048	0.12	---	0.072	---	0.09	0.109	1.00
070995	5017			510		1900		12											
070995	5018			530		2750		9											
070995	5019			530		2760		11											
080995	5021			460		1670		15											
090995	5022			500		2330		8											
090995	5023			460		1560		9											
090995	5025	41229	9503150	490	485	2040	2031	11	11	2	0.08	0.050	0.40	---	0.126	---	0.07	0.065	1.26
090995	5026	41227	9503148	490	485	1360	1621	12	12	7	0.10	0.033	0.15	---	0.064	---	0.08	0.084	0.85
090995	5027	41231	9503152	500	483	1980	1966	11	14	2	0.08	0.036	0.10	---	0.091	---	0.07	0.033	0.68
090995	5028	41226	9503147	580	560	3220	3185	21	22	7	0.13	0.065	0.13	---	0.060	---	0.09	0.075	0.73
090995	5030			510		2310		11											
090995	5031			510		2430		14											
090995	5032			460		1650		9											
090995	5033	41221	9503142	460	442	1370	1364	8	8	7	0.08	0.047	0.19	---	0.086	---	0.08	0.089	0.83
090995	5034	41230	9503151	510	491	2290	2275	9	10	7	0.07	0.040	0.27	---	0.057	---	0.06	0.061	1.05
090995	5035	41228	9503149	470	450	1780	1773	9	9	2	0.07	0.075	0.20	---	0.116	---	0.07	0.095	0.75
090995	5036	41236	9503157	460	458	1560	1548	11	10	2	< 05	0.064	0.17	---	0.113	---	< 05	0.072	0.90
090995	5037			460		1460		15											
090995	5038			540		2490		8											
090995	5041			500		2150		16											
090995	5042			580		2480		13											
090995	5043			470		1640		8											
100995	5044			560		2500		15											
100995	5045			490		1780		9											
100995	5050			580		3880		9											
100995	5051			520		2350		15											
100995	5052			520		2290		14											
100995	5054			500		2320		14											
100995	5055			480		1810		7											
100995	5056			500		1900		8											
100995	5059			480		1570		11											
100995	5064			550		2620		11											
100995	5065			560		3080		12											
100995	5066			490		1860		16											

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length (mm)		Round weight (g)		Age (y)		Sex	Tissue metal concentrations (ug/g wet weight)								
											Muscle			Kidney			Liver		
(ddmmyy)	Field collection	Genetics lab	Tissue metals	Field	Lab	Field	Lab	Fin	Oto	Mat	As	Hg	Se	As	Hg	Se	As	Hg	Se
100995	5067			500		1860		8											
100995	5068			520		2430		17											
100995	5069			520		2180		10											
100995	5070			490		2180		15											
100995	5071			530		2040													
100995	5072			460		1570		8											
100995	5073			440		1240		9											
100995	5074			470		1470		11											
110995	5077			570		2700		17											
110995	5078			500		2200		10											
110995	5079			510		2180		9											
110995	5080			530		2070		11											
110995	5081			480		1740		7											
110995	5082			540		2670		10											
110995	5083			490		2100		8											
110995	5084			510		2020		8											
110995	5085			490		1790		6											
110995	5086			580		3370		9											
110995	5087			560		2980		17											
110995	5088			500		1750													
110995	5089			480		1800		11											
110995	5090			520		2400		16											
110995	5092			560		2820		14											
110995	5093			510		2190		8											
110995	5095			510		1660		12											
110995	5096			480		1660		8											
110995	5097			560		3490		16											
110995	5098			480		1580		10											
110995	5099			500		1800		13											
110995	50100			490		1880		8											
110995	50101			500		1810		13											
110995	50102			510		1860		9											
110995	50104			530		1970		14											
110995	50105			500		1910		9											
110995	50106			520		1860		12											
110995	50107			490		1930		7											
110995	50108			550		3010		9											
120995	50112			560		2490		16											
120995	50113			510		1910		13											
120995	50114			470		1600		7											
120995	50115			490		1740		10											
120995	50116			510		2340		8											
120995	50117			560		2680		11											
120995	50118			520		2900		10											
120995	50119			590		3150		14											
120995	50120			560		2850		11											
120995	50121			520		3100		9											
120995	50122			500		1920		10											

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length		Round weight		Age		Sex	Tissue metal concentrations (ug/g wet weight)								
(ddmmyy)	Field	Genetics	Tissue	(mm)		(g)		(y)		Mat	Muscle			Kidney			Liver		
	collection	lab	metals	Field	Lab	Field	Lab	Fin	Oto		As	Hg	Se	As	Hg	Se	As	Hg	Se
120995	50123			600		3190		23											
120995	50124			510		2250		9											
120995	50130			540		2430		11											
120995	50131			510		2200		11											
120995	50132			560		2910		14											
120995	50133			570		2700		14											
120995	50134			480		1750		8											
120995	50135			540		2400		8											
120995	50136			480		1570		7											
120995	50137			510		1860		15											
120995	50138			480		1930		8											
120995	50139			440		1280		7											
120995	50140			490		1740		7											
130995	50141			530		2100		8											
130995	50142			500		2020		14											
130995	50143			490		1830		8											
130995	50144			540		2620		14											
130995	50145			540		2460													
130995	50146			580		3600		6											
130995	50147			470		1680		8											
130995	50148			560		2880		12											
130995	50149			480		1700		17											
130995	50150			470		1780		8											
130995	50151			500		1890		10											
130995	50152			540		3100		11											
130995	50153			510		2390		8											
130995	50158			460		1240		9											
130995	50159			500		1590		10											
130995	50160			560		2900		14											
130995	50161			520		2260		10											
130995	50162			520		2130													
130995	50163			510		2400		8											
130995	50164			480		1730		11											
130995	50165			520		1770		13											
130995	50166			520		2390		9											
140995	50167			480		1530		15											
140995	50168			500		2310		9											
140995	50169			530		1970		11											
140995	50170			490		1900		8											
140995	50171			510		2440		7											
140995	50172			520		1990		9											
140995	50173			560		2420		11											
140995	50174			500		1850		8											
140995	50176			550		2730		19											
140995	50177			490		1550		8											
140995	50178			540		2650		14											
140995	50179			490		1970		9											
140995	50181			460		3740		11											

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length (mm)		Round weight (g)		Age (y)		Sex	Mat	Tissue metal concentrations (ug/g wet weight)								
(ddmmyy)	Field collection	Genetics lab	Tissue metals	Field	Lab	Field	Lab	Fin	Oto			Muscle			Kidney			Liver		
												As	Hg	Se	As	Hg	Se	As	Hg	Se
140995	50182			550		5020		7												
140995	50183			540		4460		12												
140995	50184			520		5280		8												
140995	50185			510		4480		8												
Burbot, 89 mm mesh																				
070995	3021			540		940														
Burbot, 140 mm mesh																				
110995	50111			750		2740														
140995	50180			700		1830														
Inconnu, 89 mm mesh																				
060995	3007			520		1300		8												
060995	3009	41333	9503254	770	757	5030	4979	10	10	2		0.06	0.340	0.27	< 05	0.351	0.45	0.09	0.361	0.44
060995	3015	41342	9503263	850	853	6650	6662	19	19	2		5.44	0.171	0.25	0.95	0.254	0.47	2.67	0.195	0.53
070995	3037	41337	9503258	580	563	1710	1685	7	7	6		0.09	0.136	0.34	< 05	0.168	0.46	0.10	0.160	0.71
070995	3038	41324	9503245	750	730	3810	3780	12	12	2		0.08	0.428	0.24	< 05	0.689	0.30	0.07	0.652	0.85
080995	3062			760		4760		12												
080995	3076			710		3880		14												
080995	3077	41335	9503256	770	748	3790	3762	14	15	7		4.54	0.101	0.34	0.34	0.094	- - -	0.85	0.100	0.73
090995	3098	41348	9503269	720	709	3500	3449	16		7		1.44	0.189	0.36	0.52	0.173	0.44	2.01	0.151	0.89
090995	30106	41352	9503273	660	658	2880	2866	10		2		0.11	0.188	0.38	0.10	0.228	0.88	0.22	0.292	0.63
100995	30146	41339	9503260	720	715	3450	3421	12	12	7		2.95	0.105	0.27	1.11	0.100	0.65	1.65	0.104	0.64
100995	30147	41332	9503253	710	690	3500	3467	9	9	7		< 05	0.184	0.29	< 05	0.224	0.29	0.19	0.224	0.69
100995	30148	41341	9503262	760	745	4240	4202	14	14	7		- - -	0.151	0.32	0.29	0.189	0.32	0.72	0.196	0.63
110995	30181			690	678	3550	3499	10	10	7										
120995	30212			680		2860		13												
130995	30230			710		3210		11												
Inconnu, 114 mm mesh																				
060995	4006			510		1440		5												
060995	4009	41338	9503259	900	886	7760	7714	21	23	2		2.48	0.124	0.49	0.34	0.140	0.71	0.89	0.141	0.44
060995	4010	41330	9503251	750	735	3910	3889	12	12	7		1.37	0.070	0.30	0.45	0.068	0.62	0.39	0.097	0.78
060995	4021	41328	9503249	770	751	4330	4299		18	7		0.09	0.354	0.28	< 05	0.353	0.74	0.06	0.412	1.45
070995	4029			710		3360		12												
070995	4032	41329	9503250	620	597	2120	2107	9	9	7		< 05	0.231	0.30	< 05	0.323	- - -	< 05	0.274	0.86
080995	4047	41326	9503247	870	860	7410	7420	19	21	2		2.32	0.213	0.25	0.46	0.203	0.48	1.10	0.187	0.79
090995	4049			700		3230		11												
090995	4050			710		3650		9												
090995	4054			890		7370		15												
090995	4055	41347	9503268	780	765	4170	4139	15	16	7		2.46	0.114	0.25	0.68	0.142	0.36	1.99	0.116	0.80
090995	4056	41363	9503284	660	630	2670	2646	10	8	7		< 05	0.226	0.24	< 05	0.173	- - -	0.06	0.172	0.77

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length (mm)		Round weight (g)		Age (y)		Sex	Tissue metal concentrations (ug/g wet weight)								
											Muscle			Kidney			Liver		
(ddmmyy)	Field collection	Genetics lab	Tissue metals	Field	Lab	Field	Lab	Fin	Oto	Mat	As	Hg	Se	As	Hg	Se	As	Hg	Se
090995	4057	41354	9503275	800	768	5260	5229	12	13	2	< 05	0.256	0.27	< 05	0.330	0.60	0.05	0.337	0.67
090995	4058	41360	9503281	650	640	2640	2610	10	10	7	0.06	0.154	0.39	< 05	0.175	0.46	0.11	0.180	1.01
090995	4059	41325	9503246	730	694	3230	3206	11	12	7	0.09	0.346	0.28	< 05	0.193	0.63	< 05	0.196	0.78
100995	4065	41359	9503280	900	891	8170	8138	17	19	2	4.81	0.101	0.37	0.52	0.141	0.42	0.90	0.129	0.54
110995	4087			610		1960		9											
120995	4095			540		1330		6											
120995	4096			780		4740		13											
120995	4097			770		4170		13											
130995	40106			900		7130		19											
Inconnu, 140 mm mesh																			
060995	5001	41344	9503265	890	872	6750	6736	18	21	2	7.19	0.135	0.27	0.69	0.157	0.40	1.81	0.132	0.63
080995	5020	41323	9503244	760	736	4070	4041	15	15	7	3.92	0.142	0.31	0.43	0.155	0.37	0.83	0.165	1.15
090995	5024	41350	9503271	760	747	4360	4334	9		2	0.09	0.355	0.34	< 05	0.419	0.54	0.12	0.376	0.63
090995	5029	41365	9503286	820	789	5220	5172	13	14	2	9.06	0.161	0.39	0.62	0.159	0.32	1.92	0.114	0.46
090995	5039	41361	9503282	700	703	3220	3188		14	7	6.25	0.162	0.35	0.68	0.165	0.36	1.35	0.136	0.86
090995	5040	41364	9503285	790	771	4300	4247	13	15	2	0.46	0.220	0.26	< 05	0.244	0.20	0.08	0.186	0.52
100995	5046	41349	9503270	680	675	2720	2698	13	13	7	3.24	0.088	0.32	1.65	0.086	0.69	1.81	0.095	0.73
100995	5047	41357	9503278	740	740	4300	4267	11	13	2	0.09	0.272	0.31	< 05	0.331	0.61	< 05	0.363	0.80
100995	5048	41353	9503274	610	596	2420	2405	7	6	6	0.05	0.153	0.36	< 05	0.136	0.57	0.08	0.192	0.85
100995	5049	41358	9503279	720	702	3730	3703	9		7	< 05	0.225	0.25	< 05	0.235	0.31	< 05	0.232	0.59
100995	5053	41356	9503277	740	735	3740	3709	15	15	7	1.73	0.144	0.24	0.66	0.135	0.53	1.83	0.162	1.00
100995	5057	41346	9503267	550	548	1740	1725	7	8	6	0.08	0.167	0.35	< 05	0.243	0.96	0.10	0.219	0.98
100995	5058	41362	9503283	810	805	5850	5804	16	17	2	0.14	0.292	0.31	< 05	0.414	0.53	0.10	0.242	0.88
100995	5060	41331	9503252	920	909	7520	7501	18	22	2	1.38	0.184	0.29	0.69	0.259	0.28	1.06	0.172	0.79
100995	5061	41345	9503266	690	675	2950	2928	11	11	7	0.46	0.208	0.33	0.13	0.249	...	0.45	0.181	0.80
100995	5062	41340	9503261	790	788	5080	5053	12	14	2	0.58	0.157	0.29	0.10	0.222	0.30	0.31	0.183	0.50
100995	5063	41355	9503276	740	722	3830	3811	11	12	2	< 05	0.243	0.36	...	0.261	0.39	0.07	0.260	0.63
100995	5075	41343	9503264	670	650	3100	3069	7	7	7	0.12	0.119	0.25	< 05	0.120	0.31	0.18	0.118	0.61
100995	5076	41351	9503272	870	865	7340	7308	11	13	2	0.09	0.248	0.54	< 05	0.270	0.36	0.07	0.262	0.55
110995	5091	41336	9503257	680	660	2650	2581	16	16	7	1.73	0.094	0.38	0.85	0.064	0.24	3.36	0.090	0.89
110995	5094	41327	9503248	740	725	3370	3340	16	16	7	2.00	0.100	0.29	1.29	0.082	0.42	1.19	0.085	0.95
110995	50103			680		3080		11											
110995	50109			760		4920		11											
110995	50110			740		3680		10											
120995	50125			650		2460		8											
120995	50126			690		2990		10											
120995	50127			730		3460		12											
120995	50128			870		6810		17											
120995	50129			700		3120		15											
130995	50156			780		4370		14											
140995	50175			810		5160		14											
Lake chub, 140 mm																			
190795	5011			250		190		11											

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length		Round weight		Age		Sex	Tissue metal concentrations (ug/g wet weight)								
(ddmmyy)	Field collection	Genetics lab	Tissue metals	(mm) Field	Lab	(g) Field	Lab	(y) Fin	Oto	Mat	Muscle As	Hg	Se	Kidney As	Hg	Se	Liver As	Hg	Se
Lake whitefish, 89 mm mesh																			
070995	3036			360		580		9											
Lake whitefish, 114 mm mesh																			
060995	4007			350		660		6											
060995	4012			420		1020		8											
Longnose sucker, 114 mm mesh																			
080995	4042			440		940		11											
Northern pike, 89 mm mesh																			
060995	3008			480		740													
060995	3016			510		830													
060995	3017			480		690													
070995	3022			550		1120													
070995	3023			550		870													
070995	3041			490		1040													
090995	3095			540		1100													
090995	30112			500		860													
100995	30149			490		860													
100995	30150			520		870													
110995	30173			550		1080													
110995	30174			500		930													
110995	30178			500		1520													
110995	30179			540		930													
120995	30211			510		920													
130995	30224			550		1180													
140995	30242			630		1870													
140995	30254			510		2180													
Northern pike, 114 mm mesh																			
080995	4043			660		1980													
Northern pike, 140 mm mesh																			
060995	5008			390		390													
130995	50154			510		1050													
130995	50155			700		3210													
Walleye, 114 mm mesh																			
110995	4079			410		790													

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length (mm)		Round weight (g)		Age (y)		Sex	Tissue metal concentrations (ug/g wet weight)								
											Muscle			Kidney			Liver		
(ddmmyy)	Field collection	Genetics lab	Tissue metals	Field	Lab	Field	Lab	Fin	Oto	Mat	As	Hg	Se	As	Hg	Se	As	Hg	Se
LITTLE CHICAGO, SEPTEMBER 1995																			
Arctic charr, 140 mm mesh																			
090995	5066			675		3650													
Broad whitefish, 114 mm mesh																			
070995	4001	41309	9503230	560	520	2630	2608	14	17	7	< 05	0.044	0.34	- - -	0.069	- - -	< 05	0.083	1.09
070995	4002	41295	9503216	540	523	2380	2364	9	11	2	< 05	0.034	0.18	- - -	0.127	- - -	0.06	0.084	0.54
070995	4003	41297	9503218	505	482	1900	1855	6	8	7	< 05	0.058	0.25	- - -	0.099	- - -	< 05	0.125	1.03
080995	4007	41303	9503224	450	434	1310	1301	13	14	7	< 05	0.053	0.19	- - -	0.083	- - -	< 05	0.090	0.61
080995	4008	41302	9503223	515	485	2240	2209	7	11	7	< 05	0.072	0.30	- - -	0.092	- - -	0.05	0.118	0.64
080995	4009	41275	9503196	520	501	2500	2448	13	14	7	< 05	0.052	0.42	- - -	0.095	- - -	< 05	0.052	1.14
080995	4010	41321	9503242	510	495	1990	1965	8	11	2	< 05	0.075	0.35	- - -	0.102	- - -	< 05	0.062	0.65
080995	4012	41322	9503243	530	492	2650	2633	8	8	7	< 05	0.044	0.18	- - -	0.053	- - -	< 05	0.087	0.56
080995	4013	41282	9503203	600	572	3390	3390	9	11	7	< 05	0.105	0.19	- - -	0.176	- - -	0.19	0.139	0.78
080995	4014	41301	9503222	475	460	1520	1510	7	8	7	< 05	0.030	0.28	- - -	0.077	- - -	0.05	0.078	0.81
080995	4015	41316	9503237	460	448	1280	1276	16	20	7	< 05	0.040	0.15	- - -	0.086	- - -	< 05	0.112	0.42
090995	4018			480		1600													
090995	4019			550		2000		13											
090995	4020			470		1430		14											
090995	4021			515		2020		11											
090995	4022			510		2240		9											
090995	4023			490		1750		11											
090995	4024			510		1880		9											
090995	4025			510		2130		16											
090995	4026			480		1700		11											
090995	4027			480		1610		9											
090995	4028			530		1890		10											
090995	4029			500		1660		7											
090995	4030			520		2070		17											
090995	4031			530		2520		16											
090995	4032			505		2090		11											
090995	4033			515		2170		10											
090995	4034			450		1370		9											
090995	4035			475		1750		6											
090995	4036			485		1740		7											
090995	4037			470		1390		16											
090995	4038			480		1480													
100995	4041			550		2410		12											
100995	4042			480		1780		9											
100995	4043			480		1500		9											
Broad whitefish, 140 mm mesh																			
060995	5001	41313	9503234	500	485	2160	2123		18	2	< 05	0.048	0.26	- - -	0.103	- - -	0.07	0.317	0.65

Appendix 3. Biological and tissue metals data from fish captured at the Upper Ramparts and Little Chicago areas of the Mackenzie River in July and September 1995, organized by area, gillnet mesh size, and date.

Date	Sample reference number			Fork length (mm)		Round weight (g)		Age (y)		Sex	Mat	Tissue metal concentrations (ug/g wet weight)								
												Muscle			Kidney			Liver		
(ddmmyy)	Field collection	Genetics lab	Tissue metals	Field	Lab	Field	Lab	Fin	Oto			As	Hg	Se	As	Hg	Se	As	Hg	Se
060995	5002	41319	9503240	475	440	1980	1949	10	11	2		< 05	0 058	0 32	- - -	0 112	- - -	< 05	0 081	0 83
060995	5003	41272	9503193	440	420	1260	1231	8	9	7		0 11	0 033	0 17	- - -	0 086	- - -	0 06	0 098	1 25
060995	5004	41310	9503231	540	512	2190	2128	10	12	7		< 05	0 161	0 32	- - -	0 206	- - -	< 05	0 168	0 99
060995	5005	41271	9503192	550	493	1880	1851	13	14	2		0 12	0 041	0 22	- - -	0 120	- - -	0 06	0 070	1 25
060995	5006	41306	9503227	520	496	2150	2118	9	16	7		< 05	0 038	0 43	- - -	0 095	- - -	0 06	0 042	0 74
060995	5007	41292	9503213	555	525	2880	2835	7	13	7		< 05	0 059	0 32	- - -	0 121	- - -	0 05	0 149	0 88
060995	5008	41293	9503214	490	472	1710	1682	10	13	7		< 05	0 065	0 33	- - -	0 145	- - -	0 09	0 131	1 16
060995	5009	41320	9503241	480	437	1800	1749	12	11	2		0 06	0 091	0 35	- - -	0 074	- - -	< 05	0 086	0 89
060995	5010	41298	9503219	485	465	1590	1557	8	8	7		< 05	0 044	0 13	- - -	0 118	- - -	0 05	0 077	0 60
060995	5013	41291	9503212	570	542	3161	3141	15	26	2		0 05	0 018	0 21	- - -	0 152	- - -	0 10	0 063	0 73
070995	5015	41312	9503233	500	496	2340	2307	10	7	2		< 05	0 028	0 37	- - -	0 053	- - -	< 05	0 215	0 80
070995	5016	41289	9503210	500	471	2180	2153	8	8	2		< 05	0 052	0 34	- - -	0 166	- - -	0 09	0 071	0 78
070995	5017	41276	9503197	555	532	2430	2388	10	15	2		< 05	0 048	0 42	- - -	0 140	- - -	0 05	0 068	1 61
070995	5018	41286	9503207	550	510	3080	3050	11	14	2		< 05	0 026	0 26	- - -	0 074	- - -	0 06	0 038	0 67
070995	5019	41287	9503208	485	472	1860	1822	9	8	2		< 05	0 056	0 17	- - -	0 120	- - -	0 07	0 080	0 77
070995	5020	41284	9503205	485	462	1620	1587	11	11	7		< 05	0 057	0 17	- - -	0 102	- - -	0 12	0 107	0 77
070995	5021	41299	9503220	485	445	1690	1650	8	8	2		< 05	0 032	0 38	- - -	0 089	- - -	< 05	0 048	0 96
070995	5022	41288	9503209	510	488	2120	2079	8	8	7		< 05	0 041	0 19	- - -	0 083	- - -	0 06	0 123	0 89
070995	5023	41279	9503200	500	468	1980	1942	14	15	2		0 06	0 054	0 15	- - -	0 146	- - -	0 05	0 061	1 28
070995	5024	41269	9503190	470	454	1450	1392	15	18	2		0 06	0 025	0 64	- - -	0 210	- - -	0 24	0 073	2 41
070995	5026	41296	9503217	560	535	2530	2521	9	13	7		< 05	0 096	0 25	- - -	0 224	- - -	< 05	0 146	0 96
070995	5027	41280	9503201	525	510	2080	2074	15	15	7		< 05	0 042	0 22	- - -	0 160	- - -	< 05	0 111	1 54
070995	5028	41278	9503199	550	543	2580	2567	8	8	2		< 05	0 120	0 35	- - -	0 200	- - -	< 05	0 133	1 36
070995	5029	41314	9503235	510	485	1630	1614	10	11	7		< 05	0 086	0 54	- - -	0 082	- - -	< 05	0 157	1 11
070995	5030	41318	9503239	460	432	1330	1327	8	8	7		< 05	0 058	0 19	- - -	0 078	- - -	0 05	0 091	0 63
070995	5031	41285	9503206	470	455	1530	1525	14	19	2		< 05	0 036	0 12	- - -	0 115	- - -	0 09	0 072	0 50
070995	5033	41281	9503202	530	505	2050	2025	12	12	7		< 05	0 033	0 15	- - -	0 097	- - -	< 05	0 109	1 61
070995	5034	41294	9503215	500	470	1980	1953	15	20	2		< 05	0 039	0 28	- - -	0 213	- - -	0 06	0 073	0 73
070995	5035	41300	9503221	460	443	1460	1415	16	16	7		< 05	0 030	0 19	- - -	0 130	- - -	0 05	0 063	0 77
080995	5036	41305	9503226	480	469	1640	1602	15	20	2		< 05	0 108	0 17	- - -	0 088	- - -	< 05	0 070	0 45
080995	5037	41277	9503198	455	442	1430	1389	8	9	2		< 05	0 064	0 16	- - -	0 099	- - -	< 05	0 077	1 05
080995	5038	41308	9503229	510	460	2200	2177	9	9	2		< 05	0 046	0 22	- - -	0 067	- - -	0 05	0 128	0 65
080995	5039	41315	9503236	525	508	2780	2770	12	14	2		< 05	0 053	0 27	- - -	0 267	- - -	< 05	0 076	0 59
080995	5040	41317	9503238	530	496	2350	2314	14	14	2		< 05	0 087	0 15	- - -	0 109	- - -	< 05	0 123	0 59
080995	5041	41273	9503194	465	459	1590	1574	7	7	2		0 07	0 045	0 26	- - -	0 099	- - -	0 05	0 080	1 22
080995	5042	41311	9503232	530	517	2600	2587	13	14	2		< 05	0 076	0 17	- - -	0 182	- - -	< 05	0 156	0 50
080995	5043	41307	9503228	510	486	2210	2193	10	9	2		< 05	0 094	0 10	- - -	0 196	- - -	< 05	0 099	0 48
080995	5044	41304	9503225	520	504	2000	1971	8	8	7		< 05	0 059	0 21	- - -	0 077	- - -	< 05	0 093	0 48
080995	5045	41283	9503204	480	463	1640	1615	8	8	7		< 05	0 103	0 25	- - -	0 143	- - -	0 11	0 178	0 94
080995	5046	41270	9503191	500	483	1830	1817	10	11	7		< 05	0 022	0 46	- - -	0 054	- - -	0 08	0 062	1 79
080995	5047	41290	9503211	490	477	1590	1582	13	12	7		0 06	0 070	0 21	- - -	0 076	- - -	0 06	0 116	0 91
080995	5048	41274	9503195	490	468	1780	1764	13	13	2		< 05	0 053	0 36	- - -	0 133	- - -	< 05	0 090	1 56
090995	5050			580		3880		13												
090995	5051			520		2350		11												
090995	5052			520		2290		10												
090995	5053			510		1780		11												
090995	5054			500		2320		8												
090995	5055			480		1810		11												